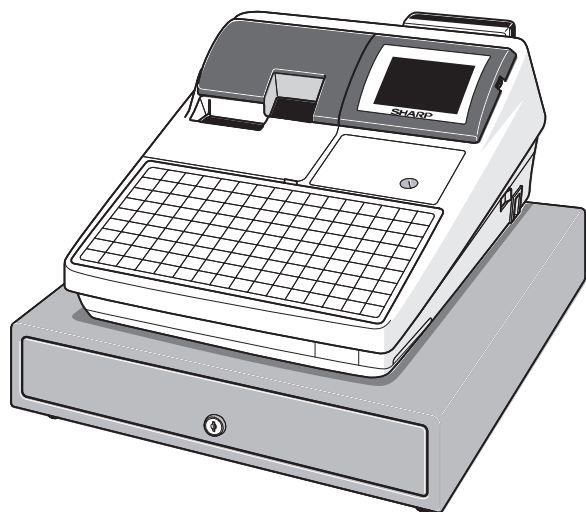


# SHARP SERVICE MANUAL

CODE : 00ZUP700USM/E



## MODEL UP-700

SRV Key : LKGIM7113RCZZ  
 PRINTER : PR-58HM  
 (For "U & A" version)

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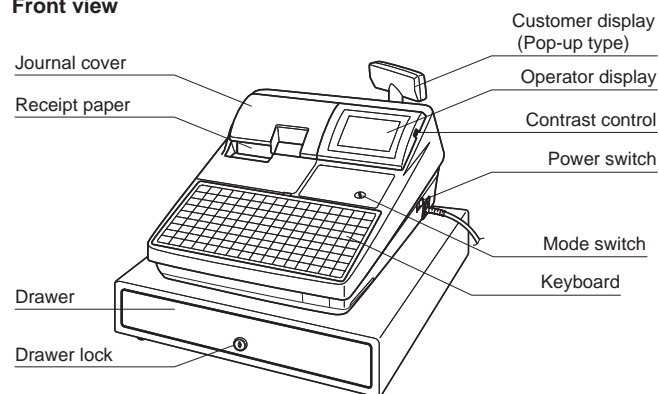
Parts marked with "△" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

# CHAPTER 1. SPECIFICATION

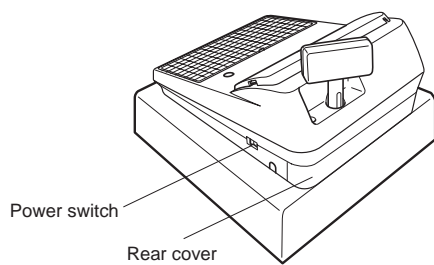
## 1. APPEARANCE

### External view

#### Front view



#### Rear view



## 2. RATING

External dimensions : With a drawer	445 (W) x 485 (D) x 312 (H) mm
Weight : With a drawer	16.4kg
Power source	120V AC $\pm$ 10%, 60Hz
Power consumption	Stand-by : 16 W Operating : 57 W (max.)
Working temperatures	0 to 40 °C

## 3. KEYBOARD

### 1) STANDARD KEYBOARD LAYOUT

RECEIPT	JOURNAL	87	88	89	90	91	92	93	94	95	96	97	98	99	100
71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
58	59	60	61	62	63	64	65	66	67	68	69	70	MISC FUNC	AUTO 1	AUTO 2
48	49	50	51	52	53	54	55	56	57	RCPT	VOID	RFND	CANCEL	LEVEL #	CONV #
38	39	40	41	42	43	44	45	46	47	SERV #	@/FOR	•	CL	P-SHIFT #	TAX SHIFT
28	29	30	31	32	33	34	35	36	37	PAGE UP	7	8	9	PLU/ SUB	GLU
18	19	20	21	22	23	24	25	26	27	PAGE DOWN	4	5	6	CHK #	SRVC
8	10	11	12	13	14	15	16	17	↑	ENTER	1	2	4	CH #	FINAL
1	2	3	4	5	6	7	8	←	↓	→	00	0	000	SBTL	CA/AT

\*1 Note:

August Production:

The [Auto 2] Key will be the [NC] Key.

### 2) KEY TOP NAME

① Standard key top

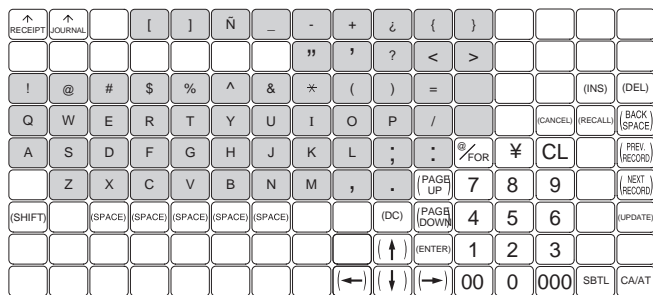
KEY TOP	DESCRIPTION
0-9,00,000	Numeric keys
•	Decimal Point key
CL	Clear key
@/FOR	Multiplication key
RECEIPT ↑	Receipt paper feed key
JOURNAL ↑	Journal paper feed key
PAGE UP	Page up key
PAGE DOWN	Page down key
CANCEL	Cancel key
← → ↑ ↓	Cursor keys
ENTER	Enter key
RFND	Refund Key
SERV#	Server code entry key
RCPT	Receipt print Key
TAX SHIFT	Tax 1 shift key
VOID	Void Key
PLU/SUB	PLU/SUB dept./UPC code entry key
(D-PLU) 1 to 100	Direct PLU 1 to 100 keys
P.SHIFT#	Price shift menu key
AUTO1, 2	Automatic sequencing 1 and 2 keys
MISC FUNC	Miscellaneous function key
CONV#	Currency conversion menu key
CHK#	Check Menu Key
CH#	Charge Menu Key
SBTL	Subtotal Key
CA/AT	Cash / amount tendered key
FINAL	Tentative finalization key
LEVEL#	PLU level shift menu key
SRVC	Service key
GLU	Guest Look-up key

## ② Optional key top

KEY TOP	DESCRIPTION
(D-PLU) 101 to 123	Direct PLU 101 to 123 Keys
(Dept) 1 to 99	Department 1 to 99 Keys
%1 to 5	Percent 1 to 5 keys
(-)1 to 5	Discount 1 to 5 keys
CH1 to 9	Charge 1 to 9 keys
CASH#	Cash menu key
FUNC. MENU	Function menu key
RP SEND	Remote printer send key
GRT EX	Gratuity exempt key
CA2 to 5	Cash 2 to 5 keys
CONV1 to 4	Conversion 1 to 4 keys
RA1 to 2	Received-on-Account 1 and 2 keys
PO1 to 2	Paid out key 1 and 2 keys
AUTO3 to 25	Automatic sequencing 3 and 25 keys
CHK1 to 5	Check 1 to 5 keys
P1 to 6	Price level shift 1 to 6 keys
LEVEL1 to 5	Menu level shift 1 to 5 keys
FS SHIFT	Food stamp shift key
FS TEND	Food stamp tender key
GD1 to 3 SHIFT	Group discount shift 1 to 3 keys
CASH TIP	Cash tip key
CHARGE TIP	Charge tip key
TIP PAID	Tip paid key
EAT IN1 to 3	Eat in 1 to 3 keys
TAX2 to 4 SHIFT	Tax 2 to 4 shift keys
NS	No sale key
SCALE	Scale entry key
OPEN TARE	Tare entry key
BAL	Balance key
DEPOSIT	Deposit key
DEPOSIT RF	Deposit refund key
DEPT#	Department number key
TAX	Manual tax key
BACL SPACE	Back space key
TRANS OUT	Transfer out key
TRANS IN	Transfer in key
RCP SW	Receipt ON/OFF key
WASTE	Waste mode key
BS	Bill separation key
BT	Bill totalize / bill transfer key (CHECK-ADD)
PRINT	Validation print key
BILL	Bill print key
PAST VOID	Past void key
SBTL VOID	Subtotal void key

KEY TOP	DESCRIPTION
GDSC %1 to %3	Group discount %1 to 3 keys
COVER CNT	Cover count key
N.C	New check key
C_NEXT	Condiments next key
EDIT TIP	Edit tip key
RP ROUND	Repeat round key
PLU MENU1 to 50	PLU menu 1 to 50 keys
MACRO1 to 4	Macro 1 to 4 keys
UPSIZE	Upsize key
CAP.1 to 10	Data capture 1 to 10 keys
GLU RECALL	Table # recall key
MSG1 to 5	Message 1 to 5 keys
MSG#	Message menu key
DELETE	Delete key
NEXT \$	Next higher dollar key
MDSE SBTL	Merchandise subtotal key
TRAY SBTL	Tray subtotal key
RTN	Return key
GAS SBTL	Gasoline sales subtotal key
AMT	Amount entry key
#/TM	Non-add code / Date & Time display key
REPEAT	Repeat key
IND. PAYMENT	Individual payment key
INQ	Inquiry key
CUST	Customer code entry key
PRICE CHANGE	UPC price change key
BIRTH	Birthday entry key
TABLE #	Table no. (seat no.) entry key
VOID MENU	Void menu key
RFND SALE	Refund sale key

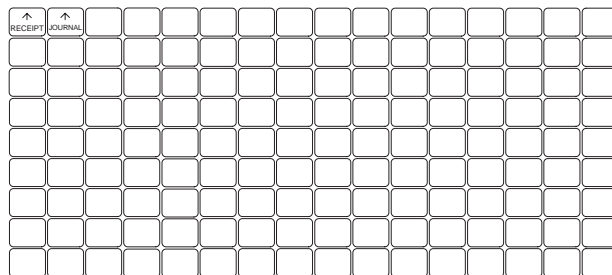
### 3) TEST PROGRAMMING KEY SHEET LAYOUT



: The shaded area contains the character keys which are used for programming characters.

KEY TOP	DESCRIPTION
SHIFT	Used for programming characters. <b>Entering upper-case letters</b> You can enter an upper-case letter by using this key. Press this key just before you enter the upper-case letter. You should press this key each time you enter an upper-case letter.
DC	Used for programming characters. <b>Entering double-size characters</b> This key toggles the double-size character mode and the normal-size character mode. The default is the normal-size character mode. When the double-size character mode is selected, the letter "W" appears at the bottom of the display.
INS	Used for programming characters. <b>To select a text editing mode</b> Toggles between the insert mode ("_") and the overwrite mode ("■").
DEL	Used for programming characters. <b>To delete a character or figure</b> Deletes a character or figure in the cursor position.
BACK SPACE	Used for programming characters. <b>To delete a character or figure</b> Backs up the cursor for deleting the character or figure at the left of the cursor. When your POS terminal is in the insert mode, this key deletes the character or the value at the cursor position.
→ ← ↑ ↓	Used to move the cursor.
ENTER	Used to program each setting.
TL	Used to finalize programming.
CANCEL	Used to cancel programming and to get back to the previous screen.
PREV RECORD	Used to go back to the previous record, e.g. from the department 2 programming window back to the department 1 programming window.
NEXT RECORD	Used to go to the next record, for example, in order to program unit prices for sequential departments.
PAGE DOWN	Used to scroll the window to go to the next page.
PAGE UP	Used to scroll the window to go back to the previous page.
CL	Used to clear the last setting you have programmed or clear the error state.
●	Used to toggle between two or more options.
SBTL	Used to list those options which you can toggle by the [●] key.
RECALL	Used to call up a desired code.
Numeric keys	Used for entering figures.

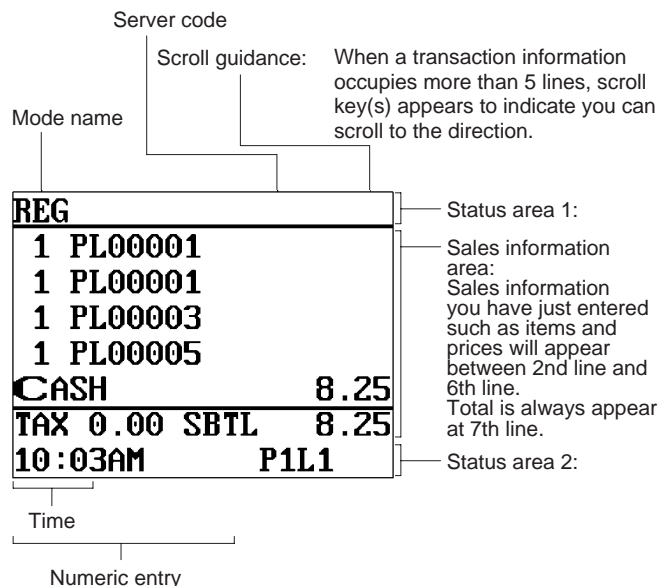
### 4) BLANK KEY SHEET LAYOUT



## 3. DISPLAY

### 1) OPERATOR DISPLAY

- Screen example 1 (REG mode)



- Price level shift indicator (P1-P6)** : Shows the PLU/UPC price level currently selected.
- PLU level shift indicator (L1-L5)** : Shows the PLU level currently selected.
- Receipt shift indicator (r)** : Shows the receipt shift status.
- Stock alarm indicator (!)** : Appears when the stock of the PLU which you entered is zero, negative or reaches the minimum stock.
- Electronic message indicator (M)** : Appears when an electronic message is received. (Status 1 area)
- Receipt ON/OFF status indicator (R)** : Appears when the receipt ON-OFF function signs OFF.
- Sentinel mark (X)** : Appears in the lower right corner of the screen when the cash in drawer exceeds a programmed sentinel amount.  
The sentinel check is performed for the total cash in drawer.



- Screen example 2 (PGM mode)

Programming item information area

Programming area: Programmable items are listed.

Caps lock indicator (A/a):  
The upper-case letter "A" appears when caps lock is on, and the lower-case letter "a" appears when caps lock is off during text programming.

Double-size character mode indicator (W):  
Appears when the double-size character mode is selected during text programming.

### Screen save mode

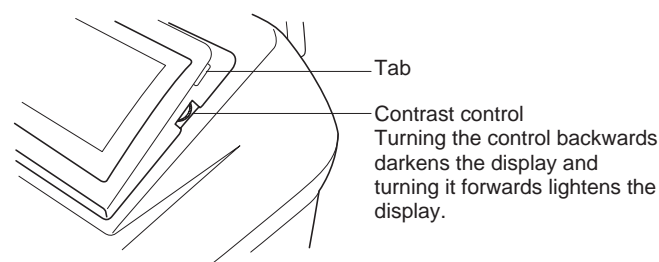
When you want to save the electric power or save the display's life, use the screen save function. This function can turn the LCD off when a server does not operate the POS terminal for an extended period of time. You can program the time for which your POS terminal should keep the normal status (in which the backlight is "ON") before it goes into the screen save mode.

To go back to the normal mode, press any key.

Device type	LCD display
Dot format	320(W) x 240(H) Full dot
Dot size	0.24 (W) x 0.21 (H) mm
Dot space	0.02 mm
Dot color	White
Back color	Dark blue

## 2) DISPLAY ADJUSTMENT (OPERATION DISPLAY)

You can adjust the contrast of the display by using the contrast control, and also you can adjust the display angle. Pull up the tab, the display will head up.



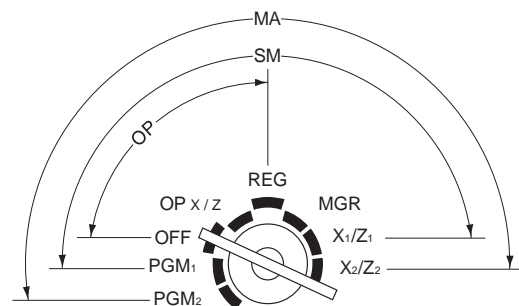
The backlight in the display is a consumable part. When the LCD display may no longer be adjusted and becomes darker, you should change the backlight.

## 3) CUSTOMER DISPLAY (Pop-up-type)

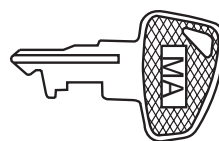


## 4. KEYS AND SWITCHES

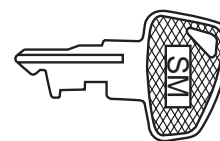
### 1) MODE SWITCH AND MODE KEYS



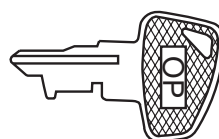
- Manager key (MA)



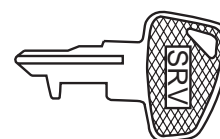
- Submanager key (SM)



- Operator key (OP)



- Service key (SRV)

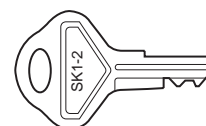


The mode switch has these settings:

- OFF:** This mode locks all register operations. No change occurs to register data.
- OP X/Z:** This setting allows cashiers/clerks to take X or Z reports for their sales information. (This setting may be used only when your register has been programmed for "OP X/Z mode available" in the PGM2 mode.)
- REG:** For entering sales
- PGM1:** To program those items that need to be changed often: e.g., unit prices of departments, PLUs or UPCs, and percentages
- PGM2:** To program all PGM1 items and those items that do not require frequent changes: e.g., date, time, or a variety of register functions
- MGR:** For manager's and submanager's entries  
The manager can use this mode to make entries that are not permitted to be made by cashiers/servers -for example, after-transaction voiding and override entry.
- X1/Z1:** To take the X/Z report for various daily totals
- X2/Z2:** To take the X/Z report for various periodic (weekly or monthly) consolidation

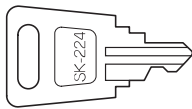
### 2) DRAWER LOCK KEY

This key locks and unlocks the drawer. To lock it, turn 90 degrees counterclockwise. To unlock it, turn 90 degrees clockwise.



#### 4) PRINTER COVER LOCK KEY

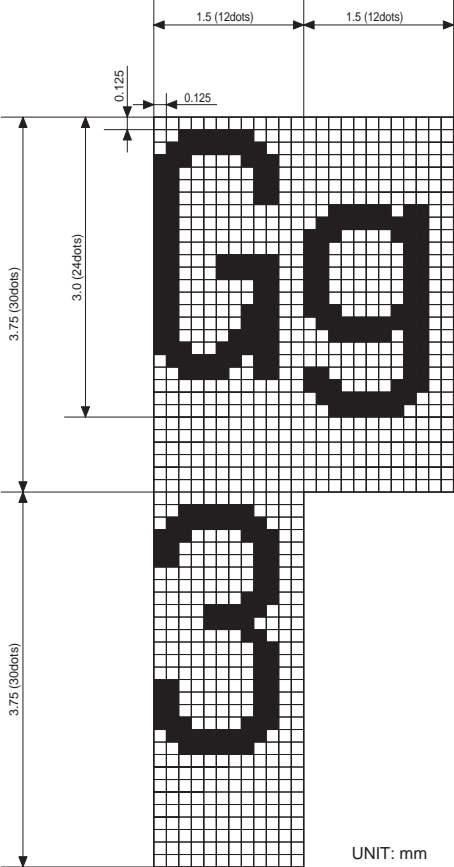
This key locks and unlocks the printer cover. To lock it, turn 90 degrees counterclockwise. To unlock, turn 90 degrees clockwise.



### 5. PRINTER

#### 1) PRINTER (PR-58HA)

Item	Description	
No. of station	2: Receipt and Journal	
Validation	No	
Printing system	Line thermal	
No. of dot	Receipt:	360 dots
	Journal	360 dots
Dot pitch	Horizontal:	0.125 mm
	Vertical:	0.125 mm
Font	10 dots (W) x 24 dots (H)	
Printing capacity	Receipt:	Max. 30 characters
	Journal:	Max. 30 characters
Character size	1.25 mm (W) x 3.0 mm (H):	At 10 x 24 dots
Print pitch	Column distance:	1.5 mm
	Row distance:	3.75 mm
Paper feed speed	Approximate 65 mm/s	
Reliability	Mechanism:	MCBF 5 million lines
Paper end sensor	Yes (Receipt and Journal)	
Cutter	Manual	
Paper near end sensor	No	
Printing area	<p>UNIT: mm</p>	

Item	Description
Printing format	12 x 24 font
	

## 2) PAPER

Item	Description
Name	Heat-quality paper
Roll dimension	57.5 ± 0.5 mm in width
Thickness	0.06 mm to 0.08 mm

## 6. DRAWER

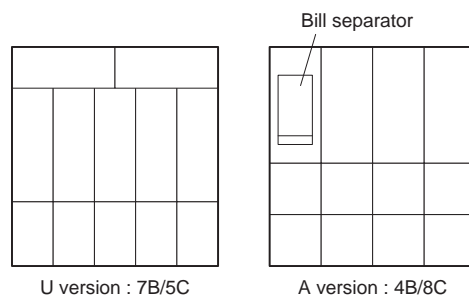
### 1) SPECIFICATION

#### (1) Drawer box and drawer

Model name	SK-460
Size	445 (W) x 464 (L) x 118 (H)
Color	GRAY 368
Material	Metal
Bell	—
Release lever	Standard equipment; Front key
Drawer open sensor	Standard equipment

## 2) MONEY CASE

	U version	A version
Separation from the drawer Allowed	Allowed	Allowed
Separation of the coin compartments from the money case	Disallowed	Disallowed
Bill separator	No	Standard (1 pcs)
Number of compartments	7B/5C	4B/8C



U version : 7B/5C

A version : 4B/8C

## 3) LOCK

Location of the lock	Front	
Method of locking and unlocking	Locking:	Insert the drawer lock key into the lock and turn it 90 degrees counterclockwise.
	Unlocking:	Insert the drawer lock key into the lock and turn it 90 degrees clockwise.
Key No.	SK1-2	

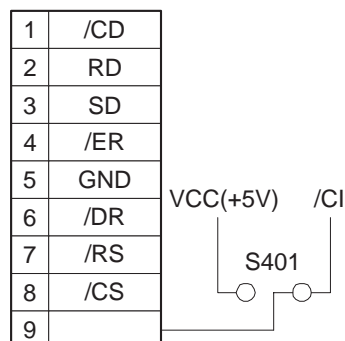
## 7. RS232 INTERFACE

This machine has two RS232 standard ports for communication to PC, Hand scanner (ER-A6HS1) and etc.

### 1) PORT 1 (CH1) (CN402)

Connector type: D-SUB 9pin

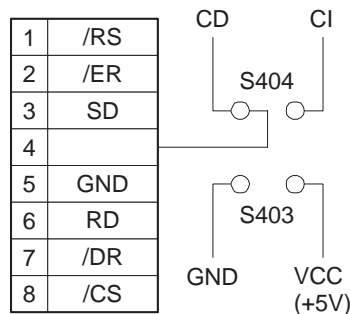
Data rate: max. 38,400 bps



### 2) PORT2 (CH2) (CN403)

Connector type: Modular jack RJ45 8pin

Data rate: max. 115,200 bps



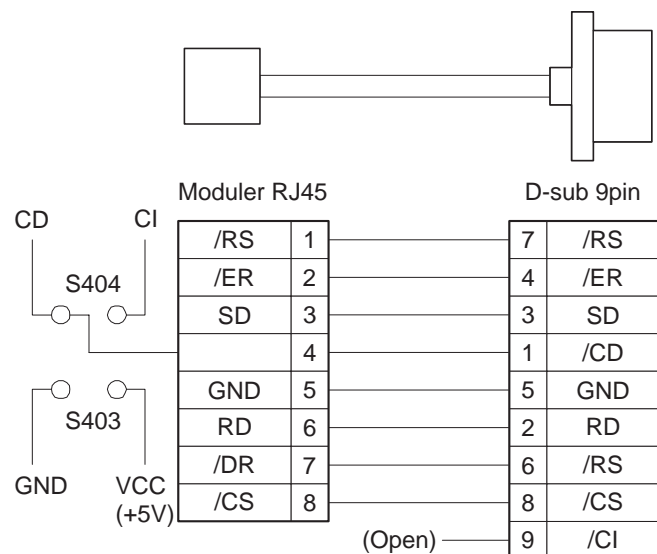
### 3) OPTIONAL DEVICES THAT CAN BE CONNECTED

Port No.	Standard port		Option port (ER-A5RS)	
	Port1: CH1	Port2: CH2	Port3:	Port4:
Type	D-SUB 9pin	Moduler RJ45	D-SUB 9pin	D-SUB 9pin
CI/+5V selectable	○	—	—	—
ER-A6HS1 (+5V necessary)	○	—	—	—
Scanner (+5V not necessary)	○	○	○	○
Modem	○	—	○	○
PC	○	○	○	○
Printer, Scale	○	○	○	○
POS utility, 02fd.exe	—	○	—	—

\* The ER-A6HS1 cannot be connected to port 2, 3 or 4 because it requires +5V.

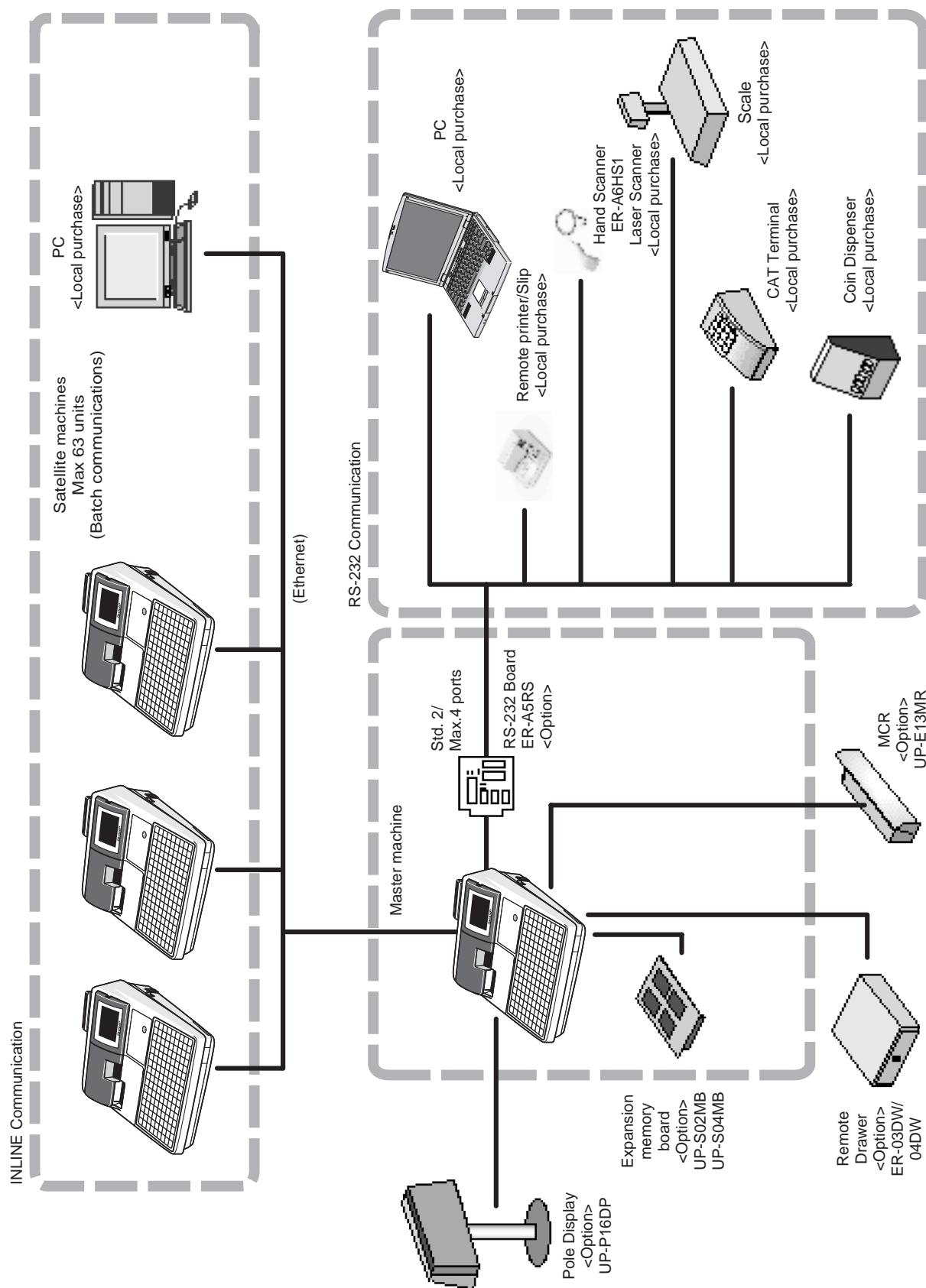
\* The modem cannot be connected to port 2 because it uses a different signal line.

\* For the modular RJ45 to D-Sub 9pin conversion cable, see the following.



## CHAPTER 2. OPTIONS

### 1. SYSTEM CONFIGURATION



## 2. SALES OPTIONS

No.	CLASSIFICATION	COMPONENT NAME	MODEL NAME	REMARK
1	Memory	Expansion RAM board	UP-S02MB	2M bytes PS-RAM board
			UP-S04MB	4M bytes PS-RAM board
2	Display	Remote display (Pole type)	UP-P16DP	11-Dig.7-Seg. + 16-Dig.Dot
3	Drawer	Remote drawer	ER-03DW	7B/5C coin case
			ER-04DW	5B/5C coin case
4	On-line function	RS232 I/F board	ER-A5RS	2 ports RS232 I/F
5	Card reader	MCR (Magnetic Card Reader)	UP-E13MR	ISO Type 1 : 3 stripe card
6	Scanner	Bar code hand scanner	ER-A6HS1	

## 3. LOCAL PURCHASE OPTIONS

No.	COMPONENT NAME	MODEL NAME	REMARK
1	External printer	TM-T88/85, TM-88 (2), TM-T80 TM-U200, TM-300	
2	Slip printer	TM-295	
3	Scale I/F	* 1	
4	Coin dispenser	* 1	
5	Color kitchen monitor	* 1	
6	CAT terminal	* 1	

\* 1: Please consult with your Sharp regional sales manager.

## 4. SERVICE OPTIONS

No.	NAME	PARTS CODE	PRICE	DESCRIPTION
1	Mode key grip cover	LKG i M7 1 2 6 BHZZ	AX	For MA key only
2	Drip proof mode switch cover	GCÖVB 7 1 0 8 BHZZ	BA	

## 5. SERVICE TOOLS

No.	NAME	PARTS CODE	PRICE	DESCRIPTION
1	Service key	LKG i M7 1 1 3 RCZZ	AF	
2	RS232 Loop Back Connector	UKÖG-6 7 0 5 RCZZ	BC	For RS232 D-SUB 9pin connector
3	RS232 modular Loop Back Connector	UKÖG-2 3 5 9 BHZZ	BC	For RS232 RJ45 Modular jack connector
4	Expansion PWB for option board	CKÖG-6 7 0 8 RCZZ	BU	For ER-A5RS
5	MCR test card	UKÖG-2 3 5 7 RCZZ	BL	For UP-E13MR

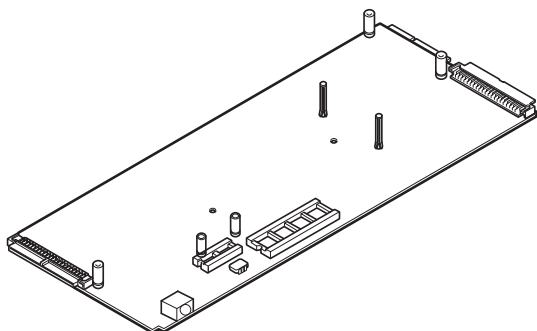
## 6. SUPPLIES

No.	NAME	PARTS CODE	PRICE	DESCRIPTION
1	Thermal roll paper	TPAPR6656RC05	BA	5 Rolls / pack
2	Thermal roll paper (High preservative type)	TPAPR6657RC05	BD	5 Rolls / pack
3	Key sheet (Normal key layout)	PSHEK2926BH5B	AR	
4	Key sheet (Character key layout)	PSHEK2927BH5B	AH	
5	Key sheet (Blank key layout)	PSHEK2930BHZA	AG	

## 7. HOW TO USE SERVICE TOOLS

### 1) EXPANSION PWB : CKOG-6708RCZZ

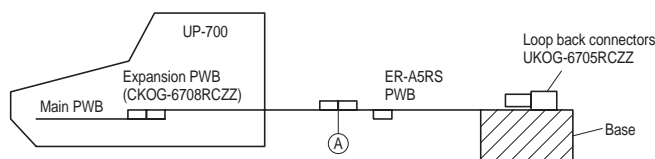
- External view



Purpose 1 : Used for servicing and repairing of options (such as the ER-A5RS) which are connected with the main body option connector.

#### [Procedure 1]

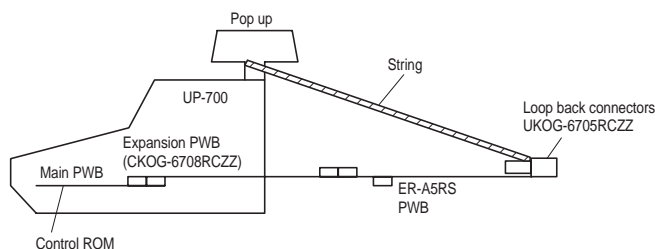
Use an insulator base as shown in the shaded section when performing servicing.



To check the option I/F PWB from the solder side, connect the I/F PWB to OPTCN2. To check from the parts side, connect to OPTCN3.

(Note) The option I/F PWB should be held horizontally so that no excessive stress is applied to connecting section (A).

#### [Procedure 2]



Put a string between the pop up and the option PWB. Adjust the length of the string so that the CKOG-6708RCZZ and the option PWB are not binding. Once verified, then you may proceed with performing service.

### 2) MCR TEST CARD : UKOG-2357RCZZ

- Used when executing the diagnostics of the UP-E13MR.
- External view



## CHAPTER 3. SERVICE PRECAUTION

### 1. IPL (Initial Program Loading) FUNCTION

#### 1) INTRODUCTION

The application software of the UP-700 is written in the flash ROM. In the following cases, writing of the application software into the flash ROM is required.

- When the flash ROM is replaced with a new one. The service part flash ROM does not include the application software in it.
- When IPL writing is required because of a change in the software.
- \* The service part of the main PWB unit includes the flash ROM with the application software written in it, and there is no need for writing the application software when replacing the main PWB unit.

#### 2) IPL PROCEDURE

There are two ways for the IPL procedures.

- IPL from P-ROM
- IPL from PC communication (Please refer to the next section)

The detailed descriptions on the above procedures are given below.

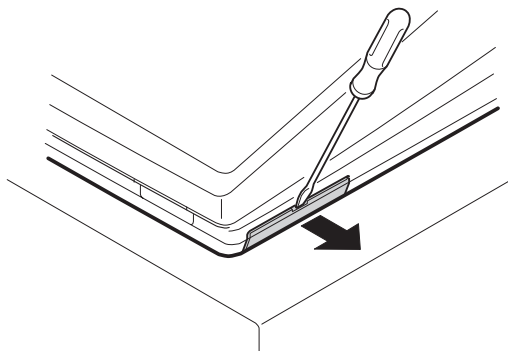
#### 3) IPL FROM P-ROM

Master ROM-1 : VHI27801RAU1A

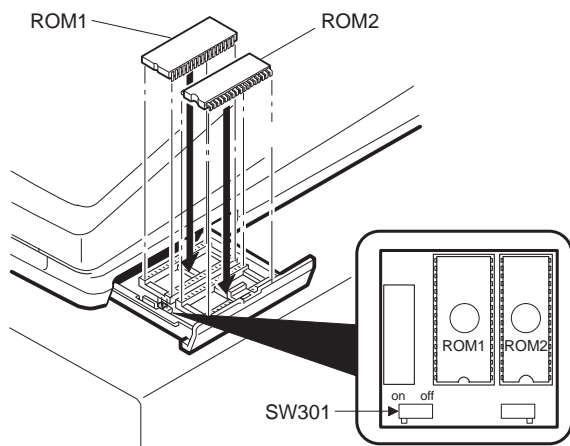
Master ROM-2 : VHI27801RAV1A

Before installation, turn off the power switch on the UP-700 and unplug the AC cord from the AC outlet.

1. Insert a screwdriver into the slit on the right side of the lower cabinet to remove the option RAM case.



2. IPL switch (SW301) on the IPL ROM PWB: Set the IPL switch (SW301) to ON position.
3. Install the ROMs into the IC sockets on the IPL ROM PWB as shown below.



4. Place the mode key to any position except OFF or SRV'.
5. Turn on the power switch of the UP-700.
6. The following display is shown and the IPL procedure is started. When the procedure is completed, the message of "Completed" is shown.

IPL from PROM

Version check...

Erase ...

IPL write start

26 27 28 29 2A 2B

2C 2D 2E 2F 30 31

32 33 34 35 36 37

38 39 3A 3B 3C 3D

3E 3F

Verify ...

Completed.

IPL write completed

7. Turn off the power switch of UP-700.
8. Remove the ROMs IC sockets on the IPL ROM PWB.
9. IPL switch (SW301) on the IPL ROM PWB: Set the IPL switch (SW301) to the OFF position.
10. Perform one of the master reset procedures.



## 2. UP-700 UTILITY TOOLS

### 1) OUTLINE

This Specification document describes the explanation about "POSUTILITYTOOL.EXE" and "02FD.EXE".

"POSUTILITYTOOL.EXE" and "02FD.EXE" works on Windows 95/98 of PC and they have the following

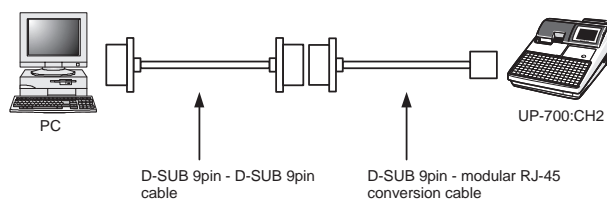
Functions by connecting UP-700 with RS232.

- POSUTILITYTOOL.EXE : IPL of UP-700 Program Object
- 02FD.EXE : All RAM Data Upload/Download (PC software tool instead of the current ER-02FD.)

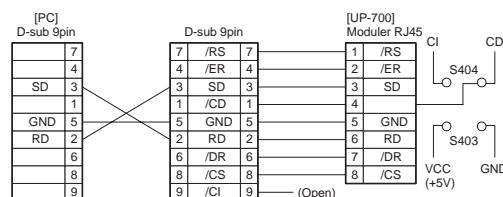
### 2) CONNECTION

PC and UP-700 are connected by RS232.

Connect the CH2 port of the UP-700 to the RS-232 interface of the PC.

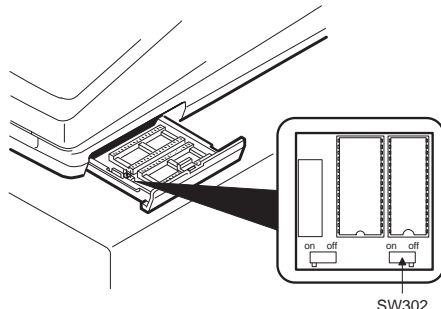
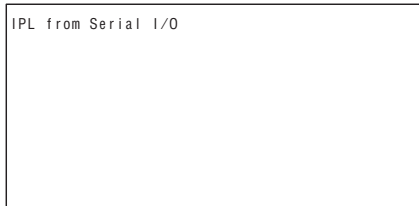


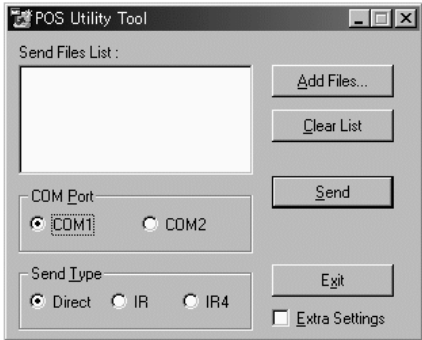
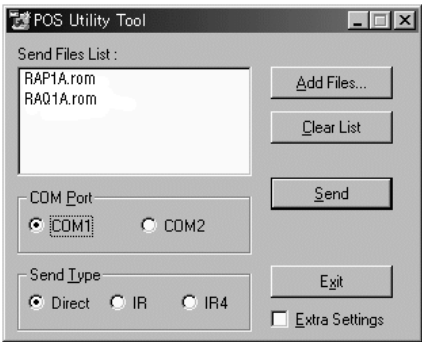
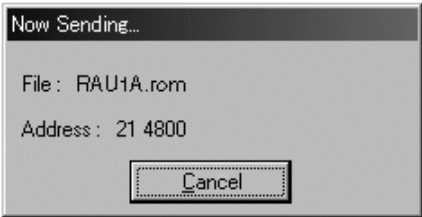
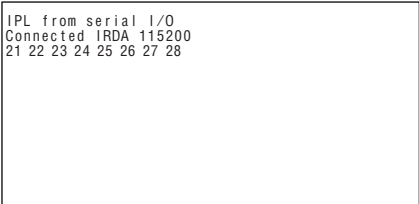
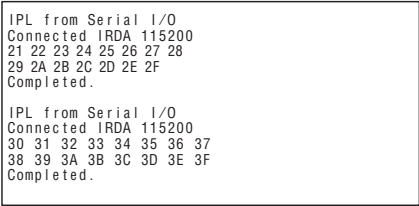
RS232 Cable Connecting:



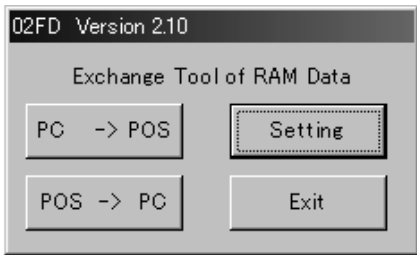
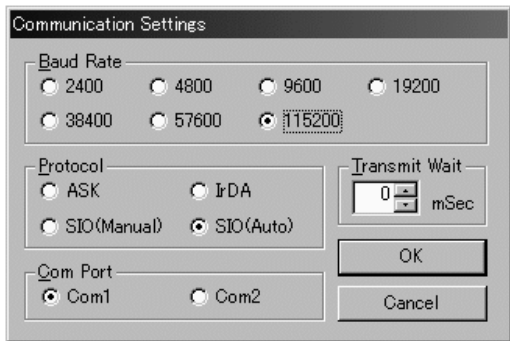
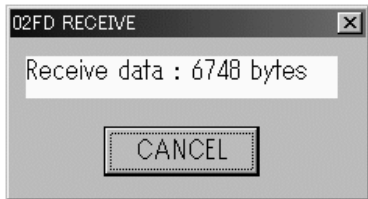
### 3) PROCEDURE

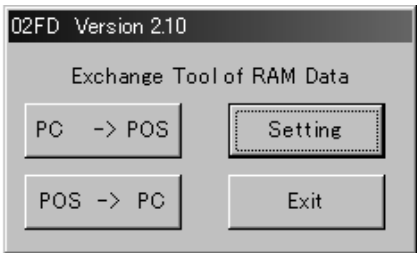
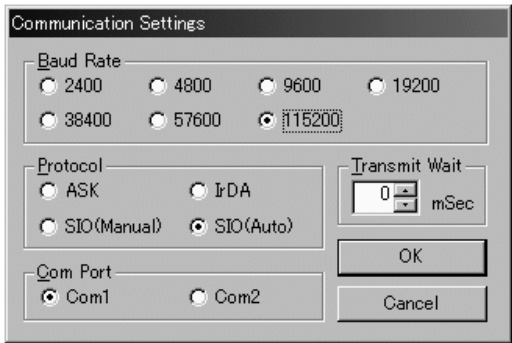
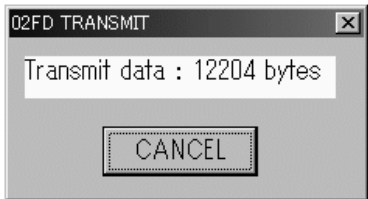

#### 3) -1. POS UTILITY TOOL

No	Procedure on P.C. side	No	Procedure on UP-700 side
1	Install "POSUTILITYTOOL.EXE" on the P.C.		
		2	Turn OFF the power.
		3	Select "IPL Mode". Set the "IPL Switch" (SW302) of the UP-700 to "ON". 
		4	Turn ON the power.
		5	Starting of "IPL Mode". The UP-700 displays. "IPL from Serial I/O" 
6	Connect the P.C. and the UP-700 (CH2) via RS232. (Fig 1)		

No	Procedure on P.C. side	No	Procedure on UP-700 side
7	<p>Execute the "POSUTILTUT00L.EXE" on the P.C. *Please close all other applications while using this utility.</p> 		
8	<p>Select the ROM object Files by clicking the "Add Files.." button.</p> 		
9	<p>Push the "SEND" button. Program data is sent to the UP-700 automatically.</p> 	9	<p>Program data is received from P.C. automatically. The UP-700 display.</p> 
10	<p>When data sending is completed, the initial Window is shown after "Complete" window.</p>	10	<p>The UP-700 displays "Completed."</p> 
		11	Turn OFF the power.
		12	<p>Select "Normal Mode". Set the "IPL switch" to "OFF". (Ref. Hardware manual)</p>
		13	Execute the "Service Reset" on UP-700.

## 3) -2. 02FD

No	Procedure on P.C. side	No	Procedure on UP-700 side
1	Install the "02FD.EXE" on the P.C. ALL RAM Data UpLoad : Go to "2" ALL RAM Data DownLoad : Go to "9"		
2	ALL RAM Data UpLoad Connect the P.C. and the UP-700 (CH2) via RS232. (Fig 1)	2	Enter the SRV mode. Select " 2 SETTING ". Select " 14 BACKUP SEND"
		3	displays <div> <div>BACKUP SEND</div> <div>SEND DATA ALL RAM</div> <div>SPEED PROGRAMMED SPEED</div> </div>
4	Execute the "02FD.EXE" on the P.C. *Please close all other applications while using this utility. 		
5	Set the Communication method by pushing the "Setting" Button.  Push the "OK" Button.		
6	Push the "Receive Start" Button. And Select the Receiving File.		
7	Communication starts. 	7	Push CA/AT key. The UP-700 displays <div>SENDING 00000</div>
8	The UpLoad is completed. The initial Window is shown. Push the "Exit" Button.	8	The UpLoad is completed. The SETTING menu is shown.
9	ALL RAM Data UpLoad Connect the P.C. and the UP-700 (CH2) via RS232. (Fig 1)	9	Enter the SRV mode. Select " 2 SETTING ". Select " 15 BACKUP RECEIVE"
		10	The UP-700 shows <div> <div>BACKUP RECEIVE</div> <div>SPEED PROGRAMMED SPEED</div> </div> Push the CA/AT key.

No	Procedure on P.C. side	No	Procedure on UP-700 side
11	<p>Execute the "02FD.EXE" on the P.C. *Please close all other applications while using this utility.</p> 		
12	<p>Set the Communication method by pushing the "Setting" Button.</p>  <p>Push the "OK" Button.</p>		
13	<p>Push the "Transmit Start" Button. And Select the Sending File.</p>		
14	<p>Communication starts.</p> 	14	<p>The UP-700 displays</p> 
15	<p>The DownLoad is completed. The initial Window is shown. Push the "Exit" Button.</p>	15	<p>DownLoad is completed. The SETTING menu is shown.</p>
		16	<p>Execute the " Service Reset " on the UP-700</p>

### 3. NOTE FOR HANDLING OF LCD

- The LCD elements are made of glass. Use extreme care when handling the LCD.  
Any strong shock applied to the LCD can cause damage.
- If the LCD element is broken and the liquid has leaked, do not come in contact with it. If the liquid is attached to your skin or cloth, immediately clean with soap.
- Use the unit under the rated conditions to prevent against damage.
- Be careful not to drop water or other liquids on the display surface.
- The reflection plate and the polarizing plate are easily scratched. Be careful not to touch them with hard objects such as glass, tweezers etc. Never hit, push, or rub the surface with hard objects.
- When installing the unit, be careful not to apply stress to the LCD module. If excessive stress is applied, abnormal display or uneven color may result.

## CHAPTER 4. SRV. RESET AND MASTER RESET

The SRV key is used for operating in the SRV mode.

### 1. SRV. RESET (Program Loop Reset)

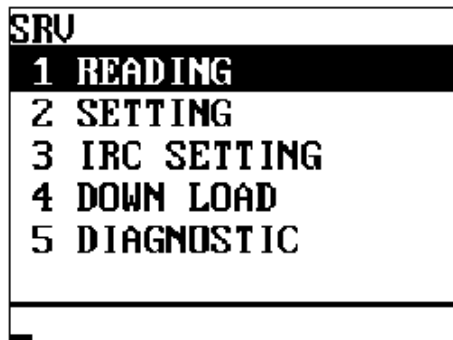
#### Procedure

- Method 1
  - 1) Turn off the AC switch.
  - 2) Set the mode switch to (SRV) position.
  - 3) Turn on the AC switch.
  - 4) Turn to (SRV) position from (SRV') position.
- Method 2
  - 1) Set the mode switch to PGM2 position.
  - 2) Turn off the AC switch.
  - 3) While holding down the JOURNAL FEED key and RECEIPT FEED keys, turn on the AC switch.

Note: When disassembling and reassembling always power up using method 1 only. Method 2 will not reset the CKDC9.

Note: SRV programming job#926-B must be set to a "4" to allow the PGM program loop reset.

PRG. RESET\*\*\*



### 2. MASTER RESET (All memory clear)

There are three possible methods to perform a master reset.

#### MRS-1 (Master resetting 1)

Used to clear all memory contents and return the machine back to its initial settings.

Return the keyboard back to the default layout.

#### Procedure

- 1) Turn off the AC switch.
- 2) Set the MODE switch to the (SRV') position.
- 3) Turn on the AC switch.
- 4) While holding down the JOURNAL FEED key, turn to the (SRV) position from the (SRV') position.

#### MRS-2 (Master resetting 2)

Used to clear all memory and keyboard contents.

This reset returns all programming back to defaults. The keyboard must be entered by hand.

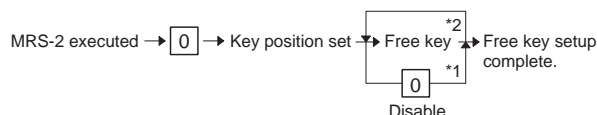
This reset is used if an application needs a different keyboard layout other than that supplied by a normal MRS-1.

#### Procedure

- 1) Turn off the AC switch.
- 2) Set the MODE switch to the (SRV') position.
- 3) Turn on the AC switch.
- 4) While holding down the JOURNAL FEED and RECEIPT FEED keys, turn to the (SRV) position from the (SRV') position.
- 5) Key position assignment:

\* After the execution of a MRS-2, only the RECEIPT FEED and JOURNAL FEED keys can remain effective on key assignment. Any key can be assigned on any key position on the main keyboard.

[key setup procedure]



MASTER RESET\*\*\*

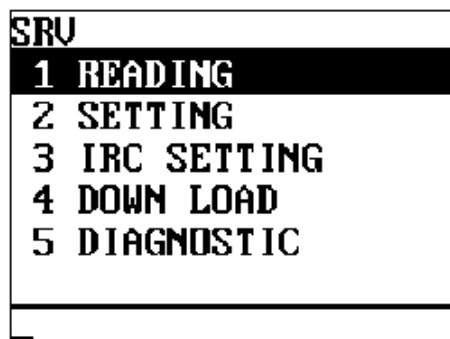
NOTES:

\*1: When the 0 key is pressed, the key of the key number on the display is disabled.

\*2: Push the key on the position to be assigned. With this, the key of the key number on the display is assigned to that key position.

\*3: When relocating the keyboard, the PGM 1/2 modes use the standard key layout.

Key No.	Key name	Key No.	Key name	Key No.	Key name
001	"0" key	011	"00" key	021	"CANCEL" key
002	"1" key	012	not shown during MRS2	022	"ENTER" key
003	"2" key	013	Decimal point "." key	023	"CA/AT" key
004	"3" key	014	"CL" key		
005	"4" key	015	"(€/FOR)" key		
006	"5" key	016	"SBTL" key		
007	"6" key	017	UP "↑" key		
008	"7" key	018	DOWN "↓" key		
009	"8" key	019	LEFT "←" key		
010	"9" key	020	RIGHT "→" key		



### MRS-3 (Master resetting 3)

Master resetting 3 requires the entry of Serial No. data in addition to Master resetting 2.

After completion of the MRS-3, the following operations and programming will be inhibited.

1. GT programming.
2. All memory download via RS-232.
3. GT resets with Z report. (Z report can be made, but the GT will not be reset.)

#### Procedure

- 1) Turn off the AC switch.
- 2) Set the reset switch to the "SRV" position.
- 3) Turn on the AC switch.
- 4) While holding down the JOURNAL FEED key and MRS-3 key, turn to the (SRV) position from the (SRV') position.

MRS-3 key : UP-700=[PLU72] key

- 5) The product serial No. input window is displayed as shown below.

DISPLAY:

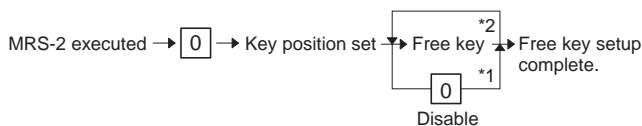
SERIAL No.	00000000
------------	----------

Enter the product serial No. of this POS and enter the [CA/AT] key.

- 6) Key position assignment:

\* After the execution of MRS-2, only the RECEIPT FEED and JOURNAL FEED keys can remain effective on key assignment.  
Any key can be assigned on any key position on the main keyboard.

[key setup procedure]



### MASTER RESET\*\*\*

#### NOTES:

\*1: When the 0 key is pressed, the key of the key number on the display is disabled.

\*2: Push the key on the position to be assigned. With this, the key of the key number the on display is assigned to that key position.

\*3: When relocating the keyboard, the PGM 1/2 modes use the standard key layout.

Key No.	Key name	Key No.	Key name	Key No.	Key name
001	"0" key	011	"00" key	021	"CANCEL" key
002	"1" key	012	not shown on a MRS3	022	"ENTER" key
003	"2" key	013	Decimal point "." key	023	"CA/AT" key
004	"3" key	014	"CL" key		
005	"4" key	015	"(@/FOR)" key		
006	"5" key	016	"SBTL" key		
007	"6" key	017	UP "↑" key		
008	"7" key	018	DOWN "↓" key		
009	"8" key	019	LEFT "←" key		
010	"9" key	020	RIGHT "→" key		

SRV
1 READING
2 SETTING
3 IRC SETTING
4 DOWN LOAD
5 DIAGNOSTIC

## CHAPTER 5. DIAGNOSTICS SPECIFICATIONS

### 1. GENERAL DESCRIPTION

This Diag Program consists of a number of Diag. programs for the UP-700, which facilitate the PWB check, process check and the operation check of the system during servicing.

The Service Diag. programs are all contained in the standard ROM.

### 2. SYSTEM COMPOSITION

UP-700 only



Fig 2-1. Service

### 3. DIAG.

#### Starting the Diag. Program

The Diag. Program is written on the external ROM, which is executed by the CPU (H8/510) and runs under the following conditions:

- ① The logic power supply is normal.  
(+5V, VCKDC, POFF, +24V)
- ② Both the I/O pins of the CPU and the CPU internal logic are normal, and the CKDC9 and MPCA9, system bus, and standard ROM/RAM are normal.

#### 1) EXECUTING DIAG PROGRAM

To start the Diag. Program, enter the SRV mode. Select the option item DIAGNOSTICS from the MENU using the cursor keys and press the ENTER key.

The DIAG. MAIN MENU appears on the screen as shown below. The cursor is displayed in reverse video and can be moved using the up/down arrow keys. Move the cursor to the menu item you want and press the ENTER key to execute the corresponding Diag. program. When each Diag. program is completed, the screen returns to the DIAG. MAIN MENU. Press the CANCEL key to exit the Diag. Program and the screen returns to the SRV mode menu screen.

```

UP-700 DIAG V1.0A
PRODUCT&TEST
RAM&ROM&SSP
CLOCK&KEY&SWITCH
SERIAL I/O
DISPLAY&PRINTER
MCR&DRAWER
TCP/IP
  
```

### 2) RAM & ROM & SSP DIAGNOSTICS

This program tests the standard RAM, expanded RAM, standard and service ROMs, and SSP circuit. RAM&ROM&SSP is selected on the MAIN MENU, the following sub-menu screen appears. The cursor shown in reverse video can be moved using the up/down arrow keys. Move the cursor to the menu item you want and press the ENTER key to execute the corresponding program. Press the CANCEL key to return the screen to this submenu.

```

RAM&ROM&SSP DIAG
Standard RAM Check
UP-S04MB Check
UP-S02MB Check
Standard ROM Check
Service ROM Check
SSP Check
  
```

#### 2)-1. Standard RAM check

##### ① Checking

The program performs the following checks on the standard 512KB of RAM. Data in memory remains unchanged before and after the checks.

The following operations are performed for the memory addresses to be checked (780000H - 7FFFFFFH).

PASS1 : Save data in memory

PASS2 : Write data "0000H"

PASS3 : Read and compare data "0000H" and write data "5555H".

PASS4 : Read and compare data "5555H" and write data "AAAAH"

PASS5 : Read and compare data "AAAAH"

PASS6 : Return data into memory

If any comparison is not normal during the check sequence from PASS 1 through 6, the error message appears.

If any error is not found up to the final address, the sequence ends normally.

Then, another round of address checks is carried out using the above check sequence

If an error occurs, the error message appears and the check stops. The read/write of the address where the error occurs is repeated.

Check point address = 780000H, 780001H  
 780002H, 780004H  
 780008H, 780010H  
 780020H, 780040H  
 780080H, 780100H  
 780200H, 780400H  
 780800H, 781000H  
 782000H, 784000H  
 788000H, 790000H  
 7A0000H, 7C0000H

## ② Display

The capacity checked is displayed in units of 64KB.

```
Standard RAM Check
512KB:PASS!!(or ERROR!!)
Error:XXXXXXH
Write:XXXXH
Read:XXXXH
```

The error address and bit are displayed only when an error occurs  
(They are not displayed if there is no error.)

## ③ How to exit the program

You can exit the program by pressing the CANCEL key after the results are displayed.

**2)-2. UP-S02MB Check**

## ① Checking

The program checks for the presence of the UP-S02MB in the following procedure.

Data in memory remains unchanged before and after checking.

- i. Write 55AAH in 9FFFFEH.
- ii. Read 9FFFFEH and compare the data with 55AAH. If both data are correct and BFFFFEH is the same as 55AAH, perform the following tests are performed. If not correct, the message "0KB: ERROR!!" appears and checking ends.

The following checks are performed on the UP-S02MB.

The following operations are performed for the address space to be checked (800000H - 9FFFFFH).

PASS1 : Save data in memory.

PASS2 : Write data "0000H".

PASS3 : Read and compare data "0000H" and write data "5555H".

PASS4 : Read and compare data "5555H" and write data "AAAAH".

PASS5 : Read and compare data "AAAAH".

PASS6 : Return data into memory.

If any comparison is not normal during the check sequence from PASS 1 through 6, the error message appears.

If any error is not found up to the final address, the sequence ends normally.

Then, another round of address checks is carried out using the above check sequence.

If an error occurs, the error message appears and the checking stops. The read/write of the address where the error occurs is repeated.

Check point address = 800000H, 800001H  
800002H, 800004H  
800008H, 800010H  
800020H, 800040H  
800080H, 800100H  
800200H, 800400H  
800800H, 801000H  
802000H, 804000H  
808000H, 810000H  
820000H, 840000H  
880000H, 900000H

## ② Display

The capacity checked is displayed in units of 64KB.

```
UP-S02MB Check
2048KB:PASS!!(or ERROR!!)
Error:XXXXXXH
Write:XXXXH
Read:XXXXH
```

The error address and bit are displayed only when an error occurs  
(They are not displayed if there is no error.)

## ③ How to exit the program

You can exit the program by pressing the CANCEL key after the results are displayed.

**2)-3. UP-S04MB Check**

## ① Checking

The program checks for the presence of the UP-S04MB in the following procedure. Data in memory remains unchanged before and after checking.

- i. After writing 55AAH in BFFFFEH, write AA55H in 9FFFFEH.
- ii. Read BFFFFEH and compare the data with 55AAH. Data in BFFFFEH is correct, the following checks are performed. Data read is AA55H, the message "UP-S02MB!!" appears and the check ends. If the data read is not either 55AAH or AA55H, the message "0KB:ERROR!!" appears and the check ends.

The following checks are performed on the UP-S04MB.

The following operations are performed for the address space to be checked (800000H - BFFFFFH).

PASS1 : Save data in memory.

PASS2 : Write data "0000H".

PASS3 : Read and compare data "0000H" and write data "5555H".

PASS4 : Read and compare data "5555H" and write data "AAAAH".

PASS5 : Read and compare data "AAAAH".

PASS6 : Return data into memory.

If any comparison is not normal during the check sequence from PASS 1 through 6, the error message appears.

If any error is not found up to the final address, the sequence ends normally.

Then, another round of address checks is carried out in the above check sequence.

If an error occurs, the error message appears and the checking stops. The read/write of the address where the error occurs is repeated.

Check point address = 800000H, 800001H  
800002H, 800004H  
800008H, 800010H  
800020H, 800040H  
800080H, 800100H  
800200H, 800400H  
800800H, 801000H  
802000H, 804000H  
808000H, 810000H  
820000H, 840000H  
880000H, 900000H  
A00000H



## ② Display

The capacity checked is displayed in units of 64KB.

```
UP-S04MB Check
4096KB:PASS!!(or ERROR!!)
Error:XXXXXXH
Write:XXXXH
Read:XXXXH
```

The error address and bit are displayed only when an error occurs  
(They are not displayed if there is no error.)

## ③ How to exit the program

You can exit the program by pressing the CANCEL key after the results are displayed.

**2)-4. Standard ROM Check**

## ① Checking

The standard ROM area (200000H - 3FFFFFFH) is added in units of bytes. When the lowest 2 digits of the result is 20H, it is regarded as normal.

In addition, the ROM version and model name code stored in the addresses 31FFE0H - 31FFFFH where the ROM version and checksum correction data are stored are displayed. Data (ASCII) is stored in the following formats:

31FFE0H~31FFE7H : Model name CODE (Example: "UP-600",  
to be displayed until DATA becomes 00H.)

31FFF0H~31FFF9H : 27801R\*\*\*\*(\*\*\*\*=PROGRAM VERSION)

31FFFAH~31FFFBH : BLOCK NO.("20"~"3F")

31FFFDH : TERMINATOR ("=")

31FFFDH~31FFFEH : BLOCK VERSION (Example: "00")

31FFFFH : CHECK SUM correction DATA

FLASH ROM used as the standard ROM has 64K-byte-unit re-write BLOCKs. To perform VERSION management in the BLOCK unit, these BLOCKs have the same 16 byte organization as those after the previous 31FFF0H and arranged every 64KBYTE. At this time, the checksum for each BLOCK is corrected to be 01H so that the entire 2MBYTE become a total of 20H.

Regarding the display of the PROGRAM VERSION, the FLASH write MASTER EPROM has 2-chip 8Mbits to allow management of the block units of the chip. The PROGRAM VERSION stored in blocks at 21H and 31H are displayed.

0 PAGE (BLOCK) where the IPL is stored, displays the PROGRAM VERSION of the IPL to make it possible to manage individual programs.

## ② Display

The capacity checked is displayed in units of 64KB.

```
Service ROM Check
PASS!!(or ERROR!!)
APL: 27801R****
      27801R****
IPL:**
```

## ③ JOURNAL print

```
BLOCK Version.
20=** 21=** 22=** 23=**
24=** 25=** 26=** 27=**
. . . . .
3C=** 3D=** 3E=** 3F=**
```

## ③ How to exit the program

④ You can exit the program by pressing the CANCEL key after the result of checking is displayed.

**2)-5. SERVICE ROM Check**

## ① Checking

The SERVICE ROM area composed of two EPROMs (D00000H - EFFFFFFH) is added in units of bytes for each chip. If the lowest 2 digits are 10H, it is regarded as normal.

In addition, the ROM version and model name code stored in the addresses D1FFE0H - D1FFFFH where the ROM version and checksum correction data are stored are displayed. Data (ASCII) is stored in the following formats:

D1FFE0H~D1FFE7H : Model name CODE(Example: "UP-600",  
to be displayed until data is 00H.)

D1FFF0H~D1FFF9H : 27801R\*\*\*\*(\*\*\*\*=PROGRAM VERSION)

D1FFFAH~D1FFFBH : BLOCK NO.("20"~"2F")

D1FFFDH : TERMINATOR ("=")

D1FFFDH~D1FFFEH : BLOCK VERSION(Example:"00")

D1FFFFH : CHECK SUM correction DATA

This SERVICE ROM is used to write data into FLASH ROM and if any error occurs during rewriting of the FLASH ROM, and it is not possible to resume the operation. Its configuration is the same as the standard ROM.

0 PAGE (BLOCK) where the IPL is stored displays the PROGRAM VERSION of the IPL to make it possible to manage individual programs.

## ② Display

The capacity checked is displayed in units of 64KB.

```
Service ROM Check
ROM1:PASS!!(or ERROR!!)
ROM2:PASS!!(or ERROR!!)
APL: 27801R****
      27801R****
IPL:**
```

## ③ JOURNAL print

```
BLOCK Version.
20=** 21=** 22=** 23=**
24=** 25=** 26=** 27=**
. . . . .
3C=** 3D=** 3E=** 3F=**
```

## ④ How to exit the program

You can exit the program by pressing the CANCEL key after the result of checking is displayed.

## 2)-6. SSP Check

### ① Checking

When started, this check program automatically sets the test SSP, performs SSP check and displays the check result.

The SSP check sets check data in the empty space in the SSP entry register. After checking is completed, only the check data is erased. Any setting remains intact before and after this check program is executed.

### ② Display

```
SSP Check
PASS!!(or ERROR!!)
```

### ③ How to exit the program

You can exit the program by pressing the CANCEL key after the results are displayed.

## 3) TIMER & KEYBOARD & CLERK SWITCH DIAGNOSTICS

This program checks the operation of the CKDC's clock crystal, keyboard and tests the clerk switch and mode switch.

You can return to the Diag menu screen by pressing the CANCEL key.

```
Timer&Key&Clerk DIAG
YY/MM/DD&HH:MM:SS
KEY CODE=***
CLERK CODE=***
MODE SWITCH=* (0~7,E:Intermediate
               position,
               F:Multiple ERROR)
```

### 3)-1. Timer Check

#### ① Checking

Check the operation of the CKDC9's clock crystal.

The area showing "YY/MM/DD & MM:HH" is continuously displayed. Check whether the display blinks in black and white every 0.5 seconds and the time shown is updated.

### 3)-2. Keyboard Check

#### ① Checking

The program check the input through the keyboard of the UP-700. A 3-digit position code corresponding to a key pressed appears on screen, along with a catch sound.

### 3)-3. Clerk SW Check (not for U version)

#### ① Checking

The code of the key inserted into the clerk key switch appears in a decimal number.

## 3)-4. Mode Switch Check

### ① Checking

The mode switch position code is displayed in a hexadecimal number.

SRV:0, PGM2:1, PGM1:2, OFF:E, OP X/Z:3, REG:4, MGR:5, X1/Z1:6, X2/Z2:7

Intermediate code:E, Multiple error F

## 4) RS232 I/F DIAGNOSTICS

The program tests the RS232 interface for the main PWB and the optional board ER-A5RS. Attach a 9-pin D-sub loop back connector (UKOG-6717RCZZ) wired as shown in Fig. 3-11, to the port you are going to test.

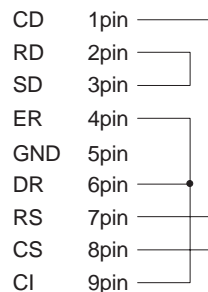


Fig. 3-11. Wiring diagram of loop back connector (UKOG-6717RCZZ)

The following menu appears on the screen. The cursor shown in reverse video can be moved using the up/down arrow keys. Move the cursor to the menu item you want to execute and select by pressing the Enter key to the corresponding Diag. Program. Press the CANCEL key to return the screen to this submenu.

When setting the channel for the RS232 interface, do not set more than two ports to the same channel. The UP-700 accommodates up to one ER-A5RS board, but use caution not to allow each port to have the same channel; otherwise the hardware might be destroyed.

```
RS232 I/F DIAG
CH1 Check
CH8 Check
```

When Diag. is started, the channel check is performed and only the channels already set appear on screen.

Note: The channel numbers displayed are logical numbers on software. In practical terms, CH1 means the CH1 of the rear connector of the POS and CH8 means the CH2 of the rear connector of the POS. If options are installed, only the ones (CH2 - CH7) which have been set will be added and displayed.

### 4)-1. CHANNEL Check

#### ① Checking

The screen shows only the channels for which have been set and are connected to the ECR. Compare the channels shown on the screen and the settings of the channel setting DIP SW of the RS232 interface board.

The RS232 on the main PWB of the UP-700 is fixed to CH1 and CH8. It is therefore necessary for the ER-A5RS to set the channel to any of CH2 - CH7.

(Ref) ER-A5RS channel settings ("1" = SW OFF, "0" = SW ON)

**ER-A5RS CON3 (RSCN1)**

S1-1	S1-2	S1-3	CHANNEL
0	0	0	Disabled
0	0	1	No setting allowed (Standard RS)
0	1	0	CHANNEL 2
0	1	1	CHANNEL 3
1	0	0	CHANNEL 4
1	0	1	CHANNEL 5
1	1	0	CHANNEL 6
1	1	1	CHANNEL 7

**ER-A5RS CON4 (RSCN2)**

S1-4	S1-5	S1-6	CHANNEL
0	0	0	Disabled
0	0	1	No setting is allowed (Standard RS)
0	1	0	CHANNEL 2
0	1	1	CHANNEL 3
1	0	0	CHANNEL 4
1	0	1	CHANNEL 5
1	1	0	CHANNEL 6
1	1	1	CHANNEL 7

**② How to exit the program**

Press the CANCEL key to exit the program.

**4)-2. CH1 Check****① Checking**

If any channel is not set, the error message (ERROR: CHx) appears. When the channel is set, the following checks are performed.

**i. Control signal check**

ERn	RSn	DRn	Cin	CDn	CSn
OFF	OFF	OFF	OFF	OFF	OFF
OFF	ON	OFF	OFF	ON	ON
ON	OFF	ON	ON	OFF	OFF
ON	ON	ON	ON	ON	ON

The program performs the read checks of the above inputs and interrupt checks of CS, CI, and CD.

During the read check, ER and RS are changed over in the above order, checking the logic of DR, CI, CD and CS.

If the check result does not agree with the logic in the table, the error message appears. "ON" in the table means active low and "OFF" means active high.

In the interrupt check, the CS, CI and CD interrupts are permitted one by one (The mask is canceled.).

The error message appears if an interrupt does not occur when each signal is active or if an interrupt occurs when each signal is not active.

Four cycles of the above check is performed.

**ii. Data transfer check**

As check data, loop back data transfer of 256 bytes of 00H - 0FFH is performed. The baud rate is 38400 bps.

**iii. TIMER CHECK (RS232 ON BOARD TIMER)**

Before starting the check ii, perform the RCVDT start of the timer you want to check and set to 5 ms. Make sure::

- No TRQ- is generated during the implementation of check ii.
- TRQ- is generated at 5 ms after check ii is completed.

**② Display**

RS232 CH1 Check  
PASS!!(or ERROR!!)

Details of the errors are printed on the journal.

ERROR No.	ERROR print	Details of ERROR
1	ER-DR : ERROR	ER-DR LOOP ERROR
2	ER-CI : ERROR	ER-CI LOOP ERROR
3	RS-CD : ERROR	RS-CD LOOP ERROR
4	RS-CS : ERROR	RS-CS LOOP ERROR
5	CI INT : ERROR	No CI interrupt occurs.
6	CD INT : ERROR	No CD interrupt occurs.
7	CS INT : ERROR	No CD interrupt occurs.
8	TXEMP : ERROR	TXEMP is not set.
9	TXEMP INT : ERROR	TXEMP interrupt does not occur.
10	TXRDY : ERROR	TXRDY is not set.
11	TXRDY INT : ERROR	TXRDY interrupt does not occur.
12	RCVRDY : ERROR	RCVRDY is not set. (Not possible to receive. TRQ- occurs during the implementation of check ii.)
13	RCVRDY INT : ERROR	RCVRDY interrupt does not occur.
14	SD-RD : ERROR	SD-RD LOOP ERROR (DATA ERROR)
15	SD-RD : ERROR	SD-RD LOOP ERROR (DATA ERROR)
16	TIMER : ERROR	TIMER ERROR (After check ii is completed)
17	TIMER INT : ERROR	TRQ1- interrupt does not occur.

**③ How to exit the program**

Press the CANCEL key to exit the program.

**4)-3. CH2 Check**

## ① Checking

The procedure for checking, display and the method of exiting the programs are the same as for the CH1 check.

**4)-4. CH3 Check**

## ① Checking

The procedure for checking, display and the method of exiting the program are the same as for the CH1 check.

**4)-5. CH4 Check**

## ① Checking

The procedure for checking, display and the method of exiting the program are the same as for the CH1 check.

**4)-6. CH5 Check**

## ① Checking

The procedure for checking, display and the method of exiting the programs are the same as for the CH1 check.

**4)-7. CH6 Check**

## ① Checking

The procedure for checking, display and the method of exiting the programs are the same as for the CH1 check.

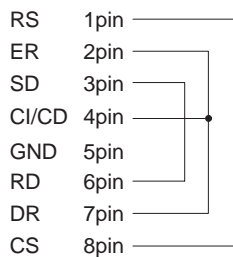
**4)-8. CH7 Check**

## ① Checking

The procedure for checking, display and the method of exiting the programs are the same as for the CH1 check.

**4)-9. CH8 Check**

For checking CH8, the following loop-back connectors are used.



## ① Checking

The following checks are performed.

## i. Control signal check

ER8	RS8	DR8	Ci8	CD8	CS8
OFF	OFF	OFF	OFF	OFF	OFF
OFF	ON	OFF	**	**	ON
ON	OFF	ON	**	**	OFF
ON	ON	ON	**	**	ON

The program performs the read checks of the above inputs.

During the read check, ER and RS are changed over in the above order, checking the logic of DR, CI, CD and CS.

If the logic is different from those listed in the table, the error message appears.

**PATTERN 1**

ER8	RS8	CI8	CD8
OFF	ON	OFF	OFF
ON	OFF	OFF	OFF
ON	ON	OFF	OFF

"No Connect" is displayed on the next line of PASS!!

**PATTERN 2**

ER8	RS8	CI8	CD8
OFF	ON	OFF	OFF
ON	OFF	ON	OFF
ON	ON	ON	OFF

"CI Connect is displayed on the next line of PASS!!

**PATTERN 3**

ER8	RS8	CI8	CD8
OFF	ON	OFF	OFF
ON	OFF	OFF	ON
ON	ON	OFF	ON

"CD Connect! is displayed on the next line of PASS!!

If the logic is different from those in PATTERN 1 - 3, the error message appears.

"ON" means active low and "OFF" active high.

The above checks are repeated for four cycles.

## ii. Data transfer check

As check data, loop back data transfer of 256 bytes of 00H - 0FFH is performed, the baud rate is set for 115200 bps.

## ② Display

RS232 CH8 Check  
PASS!!(or ERROR!!)  
CD Connect(or CI Connect, No Connect)

Details of the errors are printed on the journal.

ERROR No.	ERROR print	Details of ERROR
1	ER-DR : ERROR	ER-DR LOOP ERROR
2	ER-CI : ERROR	ER-CI LOOP ERROR
3	RS-CD : ERROR	RS-CD LOOP ERROR
4	RS-CS : ERROR	RS-CS LOOP ERROR
5		
6		
7		
8	TXEMP : ERROR	TXEMP is not set.
9	TXEMP INT : ERROR	TXEMP interrupt does not occur.
10	TXRDY : ERROR	TXRDY is not set.
11	TXRDY INT : ERROR	TXRDY interrupt does not occur.

ERROR No.	ERROR print	Details of ERROR
12	RCVRDY : ERROR	RCVRDY is not set. (Not possible to receive. TRQ- occurs during the implementation of check ii.)
13	RCVRDY INT : ERROR	RCVRDY interrupt does not occur.
14	SD-RD : ERROR	SD-RD LOOP ERROR (DATA ERROR)
15	SD-RD : ERROR	SD-RD LOOP ERROR (DATA ERROR, FRAMING ERROR, and others)
16		
17		
18	CI : ERROR	The logic of C1 is ON, but different from those in 1~3.
19	CD : ERROR	The logic of CD is ON, but different from those in 1~3.

③ How to exit the program.

Press the CANCEL key to exit the program.

## 5) LCD/POPUP/POLE DISPLAY & PRINTER DIAGNOSTICS

The program tests the LCD, popup and pole displays of the UP-700.

The following menu appears on screen. The cursor shown in reverse video can be moved using the up/down arrow keys. Move the cursor to the menu item you want to execute and select by pressing the Enter key to execute the corresponding Diag. program. You can return the screen to this submenu by pressing the CANCEL key.

DISPLAY&PRINTER DIAG
<b>LCD Check</b>
POPUP Check
POLE Check
PRINTER Check
PRINTER CG Check
PES&NES SENSOR Check
A/D CONVERTER Check

The test program displays the following test patterns in the order shown below. You can move to the next pattern by pressing the ENTER key.

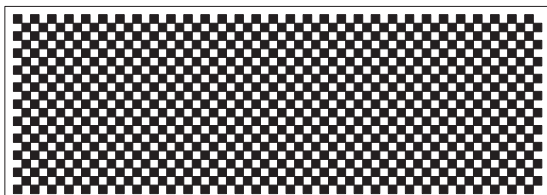
You can return the screen to this submenu by pressing the ENTER key when the final test pattern is shown on the screen or by pressing the CANCEL key during the implementation of the check.

### 5)-1. Liquid Crystal Display Check

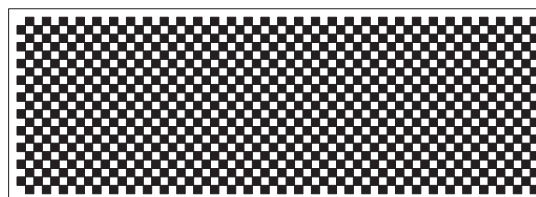
#### ① Checking

The screen shows the following test patterns. Press the ENTER key to move to the next test pattern.

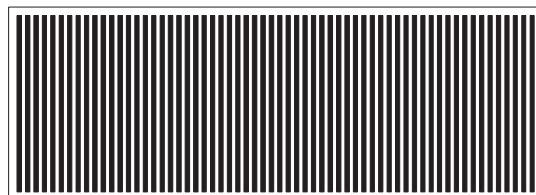
- i. Black and white checkered pattern with 1-dot spacing.



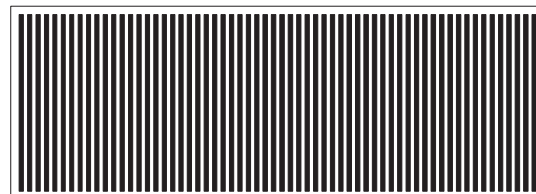
- ii. Reverse-videoed test pattern of i



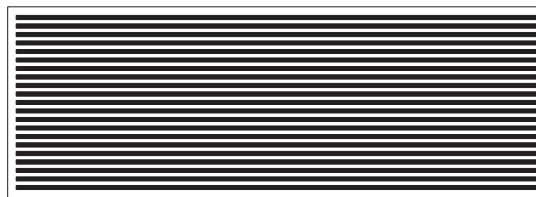
- iii. Vertical stripe pattern with 1-dot spacing



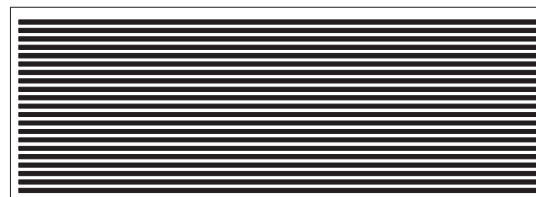
- iv. Reverse-videoed test pattern of iii



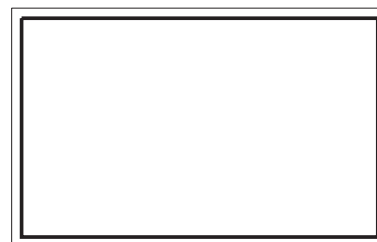
- v. Horizontal stripe pattern with 1-dot spacing



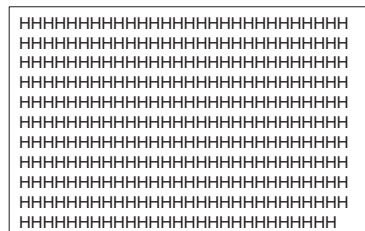
- vi. Reserve-videoed test pattern of v



- vii. The outermost periphery of LCD's active area is displayed in 1-dot line.



- viii. "H" pattern. "H" is displayed in 20 digits and 8 lines. "H" is displayed in 19 digits only in the 8th line.



## ③ How to exit the program.

You can exit the program by pressing the ENTER key when the final test pattern is shown on the screen or by pressing the CANCEL key during checking.

**5)-2. Pole Display Check**

## ① Checking

The screen shows the following test patterns in the order given below. Press the ENTER key to move to the next pattern.

i. The following test patterns are displayed.

DOT DISPLAY : 0 1 2 3 4 5 6 7 8 9 ; A a B b C

7SEG DISPLAY : 0. 1. 2. 3. 4. 5. 6. 7. 8. 9. -.  


ii. The test pattern where all digits are turned ON is displayed.

## ② Display

POLE Display Check



## ③ How to exit the program.

You can return to the Diag. submenu by pressing the ENTER key after the 2nd test pattern where all digits are turned ON and are displayed. Or press the CANCEL key to erase the screen to exit the program.

**5)-3. Popup Display Check**

## ① Checking

The screen shows the following test patterns in the order given below. Press ENTER to move to the next pattern.

i. The following test patterns are displayed.

7 SEG DISPLAY : 0. 1. 2. 3. 4. 5. 6.

ii. The test pattern where all digits are turned ON is displayed.

## ② Display

POPUP Display Check



## ③ How to exit the program

You can return to the Diag. submenu by pressing the ENTER key after the 2nd test pattern where all digits are turned ON and are displayed. Or press the CANCEL key to erase the screen to exit the program.

**5)-4. PRINTER Check**

## ① Checking

The printer prints on the RECEIPT/JOURNAL PRINTER.

## ② Display

PRINTER Check



## ③ JOURNAL/RECEIPT print

UP-600/700 DIAGNOSTICS V1.0A

△△△△△△△△△△△△△△	30 digits are printed
△△△△△△△△△△△△△△	30 digits are printed
▽▽▽▽▽▽▽▽▽▽▽▽▽▽	30 digits are printed
▽▽▽▽▽▽▽▽▽▽▽▽▽▽	30 digits are printed
□□□□□□□□□□□□□□	30 digits are printed

Enlargement 

Enlargement 

## ④ How to exit the program

One second after printing is completed, the screen returns to the PRINTER Check of the DISPLAY & PRINTER MENU.

**5)-5. PRINTER CG Check**

## ① Checking

The printer prints the built-in CG onto the RECEIPT/JOURNAL PRINTER.

For standard characters are printed in 16 characters/line and extended ASCII characters (enlarged characters) are printed in 8 characters/line.

Standard characters are printed first, followed by the extended ASCII characters.

Check the outputted print to see if CG is correctly printed.

## ② Display

PRINTER CG Check



## ③ How to exit the program.

Press the CANCEL key to exit the program after 1 cycle of printing is completed.

## 5)-6. PES & NES SENSOR Check

### ① Checking

The screen displays the operating status of the paper end sensor and paper near end sensor of the receipt/journal printer.

### ② Display

```
PES&NES SENSOR Check
NES : 0 (or 1)
RPES : 0 (or 1)
JPES : 0 (or 1)
OPBS : 0 (or 1)
```

Display	Status	Description
NES	0	Senses the near end of the journal paper roll.
	1	Does not sense the near end of the journal paper roll.
RPES	0	Senses the end of the receipt paper roll.
	1	Does not sense the end of the receipt paper roll.
JPES	0	Senses the end of the journal paper roll.
	1	Does not sense the end of the journal paper roll.
OPBS	0	IPL ROM PWB not connected
	1	IPL ROM PWB connected

### ③ How to exit the program

Press the CANCEL key to exit the program.

## 5)-7. A/D Converter Check

### ① Checking

The digital values of signals inputted into the A/D converter of the CPU are displayed one by one. The data on the screen are updated at an interval of about 1 second by the timer.

### ② Screen

```
A/D CONVERTER Check
TM=***
VRF=***
VP=***
```

Note 1: VRF means a VRF estimated voltage calculated on the assumption that VCC is +5V.

Note 2: In the \*\*\* section, 10-bit data of the A/D converter is indicated in hexadecimal numbers. The numbers are from "000" to "3FF".

### ③ How to exit the program

Press the CANCEL key to exit the program.

## 6) TCP/IP STACK NETWORK DIAGNOSTICS

The program performs the TCP/IP stack test.

The test requirements are as follows:

- UP-700
- 10BASE-T cable (for data transfer testing)
- HUB (for loop back test and data transfer test where 2 or more units are used.)

The following menu appears. The cursor shown in reverse video can be moved using the up/down arrow keys. Move the cursor to the menu item you want to execute and press the ENTER key to execute the corresponding check program. After the selected Diag. program is completed, the screen returns to this menu.

Press the CANCEL key to return the screen to the Diag. submenu.

```
TCP/IP&PRINTER DIAG
SELF Check
LOOPBACK Check
MAC ADDR&FIRM Ver. Read
MAC ADDR&FIRM WRITE
DATA Trans.(MA)
DATA Trans.(SA)
```

## 6)-1. SELF Check

### ① Checking

The program executes Diag's built in TCP/IP stack board and displays the results.

- Execute the flash memory test command and display the result.
- Execute the SRAM test command and display the result.
- Execute the dual-port RAM test and display the result.
- Execute the interrupt test command and display the result.

The information inside the error status is as follows:

b7	Reserved ("0" is always displayed)
b6	Reserved ("0" is always displayed)
b5	Reserved ("0" is always displayed)
b4	Reserved ("0" is always displayed)
b3	HR_RST : If /INTHR cannot be canceled
b2	HR_ACK:If /INTHR does not enter after waiting for 10 ms
b1	HW_RST : If /INTHW cannot be canceled
b0	Reserved ("0" is always displayed)

### ② Display

```
SELF Check
FLASH : PASS (or ERROR)
SRAM : PASS (or ERROR)
XXXXXXXX : XX : XX
DPRAM : PASS (or ERROR)
XXXXXXXX : XX : XX
INTERRUPT : PASS (or ERROR)
XXXXXXXX
```

When an error occurs, the address and data are displayed.

When an error occurs, the address and data are displayed.

When an error occurs, the data is displayed.

### ③ How to exit the program.

Press the CANCEL key to exit the program.







## 6)-5. Data Transmission Check

The program performs a data transfer test using an actual established system.

The system consists of 1 master machine and up to 63 satellite machines.

Caution to be taken when starting the test.

- If this test is performed on the ECRs set for LAN, cancel the settings before starting the test.
- If this test is performed using an established system, disconnect the LAN cables from the ECRs you do not want to test or cancel their LAN settings. If the test is performed with those ECRs set for LAN, their data might be destroyed.
- After canceling the LAN settings of all ECRs on the system, set them for data the transfer test.  
Set the satellite machines first, and then set the master machine.
- The Diag of the UP-700 uses a private IP address. Each IP address is unique on the Internet. When building a private network, you should be careful not to allow your internal packet used for your own network to leak to the Internet, because it might cause confusion. The Internet Assigned Numbers Authority (IANA) specifies IP addresses that can be used without registration. These addresses can only be used within a private network and are not route controlled between sites of the Internet.

Class A : 10.x.x.x

Class B : 172.16.x.x 172.31.x.x

Class C : 192.168.0.x?192.168.255.x

It is strongly recommended to use addresses within the above range when building a private network.

In this Diag. program, the following private IP addresses are assigned to the terminal Nos. (1 - 64).

TERMINAL NO.1 = 192.168.0.1

TERMINAL NO.2 = 192.168.0.2

.....

TERMINAL NO.31 = 192.168.0.63

TERMINAL NO.32 = 192.168.0.64

### ① Setting

#### i. Setting satellite machines

On the menu screen, select DATA Trans. (SA). The screen is shown below:

DATA Trans.(SA)  
 INPUT SA T-NO. : \_\_\_\_\_

Enter a number within the range from 1 64.

Enter the terminal No. of the machine you are going to test (a 2-digit number from 1 - 32) + Enter. The screen looks like this:

DATA Trans.(SA)  
 INPUT SA T-NO. : XX  
 DATA SEQ.NO. : 0000

The terminal No. you entered is displayed.

#### i. Setting the master machine.

On the menu screen, select DATA Trans. (MA). The screen looks like this:

DATA Trans.(MA)  
 INPUT MA T-NO. : \_\_\_\_\_

Enter a number within a range from 1~64.

Enter the terminal No. of the machine you want to test (a 2-digit number from 1 - 64)+ Enter. The screen looks like this:

DATA Trans.(MA)  
 INPUT MA T-NO. : XX  
 INPUT SA T-NO. : \_\_\_\_\_

The terminal No. you entered is displayed.

Enter the terminal No. (a 2-digit number from 1 -64) of the satellite machines which are connected to the test machine + Enter. The screen looks like this:

DATA Trans.(MA)  
 INPUT MA T-NO. : XX  
 INPUT SA T-NO. : XX( or XXXX)

The terminal No. of the master machine you entered is displayed.

The terminal No. of the satellite machine you entered is displayed.

When performing the test with multiple satellite machines, type their terminal numbers (2-digit numbers within the range from 1~64) and press Enter. In addition, you specify the satellite machines using the area specification function without typing terminal numbers. This is achieved by typing the first terminal number (2 digits) and the last terminal number (2 digits) of the satellite machines and then press Enter. For example, if you want to specify the terminal numbers of satellite machines from 5 to 15, type "0515" for T-No. and press Enter. When executing, press the Enter key without typing the terminal numbers.

The display appears like this:

Note that the terminal numbers of the master machine and satellite machines should not be the same. When the terminal numbers are to be specified using the area specification function, any terminal number that is used for the master machine will be excluded from the specification of satellite machine terminal numbers.

INPUT MA T-NO. : XX  
  
 DATA SEQ.NO. : 0000

The terminal No. of the master machine you entered is displayed.

With the above setting, data transfer is performed between the master machine and the satellite machines.

## ② Checking

- i. The master machine sends data of the following format consisting of 2-byte sequence No. and 254-byte AAH data to the satellite machine. The master machine displays the sequence Nos.

Test data format (1 packet: 256 bytes)

1	2	3	4	5	...	...	...	254	255	256	byte
XX	XX	AA	AA	AA	...	...	...	AA	AA	AA	

XXXX : Sequence No. 2 bytes (4-digit binary coded decimal number)

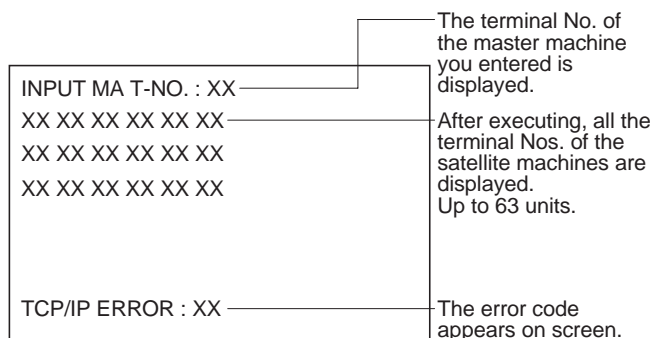
AA : Transfer (AAH) ~ 254 bytes

- ii. The satellite machine returns the data it has received, to the master machine as it is. The satellite machine displays the sequence No. on the screen.
- iii. The master machine receives the data and then checks the sequence Nos. and 254-byte AAH data. If an error occurs, the master machine displays an error code and ends the test. If there are multiple satellite machines, steps i and ii are repeated.

The master machine advances the sequence No. when data is transferred successfully between it and the satellite machines.

Steps i - iii are repeated.

## ③ Error display



The following error codes are used (same as for TCP/IP HANDLER)

01	Command error (excluding the time when data is sent)
02	No data received
03	Received data size present Received data left
04	Receiving station not ready for receiving (when sending) "NRDY" is returned because the receiving station is not ready for receiving.
05	Receiving buffer full(when sending) The receiving side's controller receive buffer is full.
06	Resend error(When sending) The number of retries exceeds the setting (5 times) when no response is obtained.
07	Collision error (When sending) If a collision occurs
08	Line busy time out Data cannot be sent due to multiple stations communicating
09	Receiving data size over (when receiving) Insufficient size of receiving buffer.
0A	Hardware error Interface error (No SRN interface or defective SRN controller)

## ③ How to exit the program

Press the CANCEL key to exit the program.

## 7) MCR &amp; DRAWER Diagnostics

The program checks the MCR and drawer.

The following menu appears on screen.

The cursor shown in reverse video can be moved using the up/down arrow keys. Move the cursor to the menu item you want to execute and select by pressing the ENTER key to execute the corresponding program. Press the CANCEL key to return the screen to this sub-menu.

```

MCR&DRAWER Check
MCR Check
DRAWER 1 Check
DRAWER 2 Check
  
```

## 7)-1. Magnetic Card Reader Check

The program performs the read test of an optional UP-E13MR.

The test program reads a magnetic card using the ISO7811/1-5 standard and prints data on the journal.

Press the CANCEL key to return the screen to the submenu.

## ① Checking

The program reads tracks 1 - 3 of a magnetic card using the ISO7811/1'5 standard and prints the data with the ASCII codes.

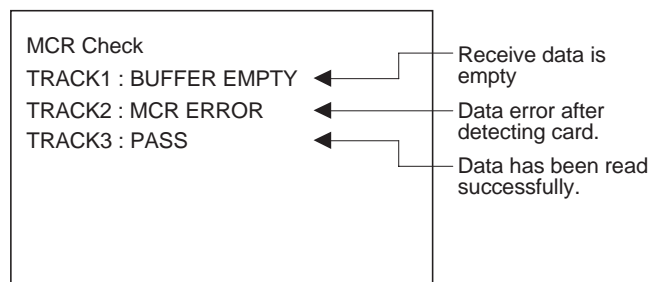
## ② JOURNAL print

```

MCR Check
TRACK1:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
TRACK2:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
TRACK3:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
  
```

Data read by the MCR is printed in the areas XXXXXX. If an error occurs, the following error codes are displayed. Until the program is terminated, the error code is repeated, standing by for reading.

## ③ Display

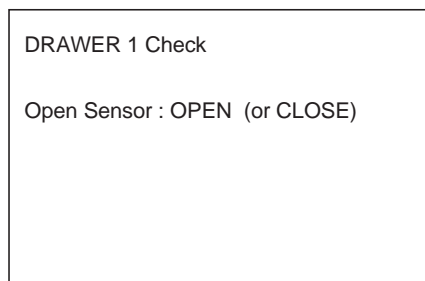


## ④ How to exit the program.

Press the CANCEL key to exit the program.

**7)-2. Drawer 1 Check****① Checking**

The program turns on the drawer 1 solenoid, senses the value of the drawer open sensor every 100 ms, and displays the operating status.

**② Display****③ How to exit the program**

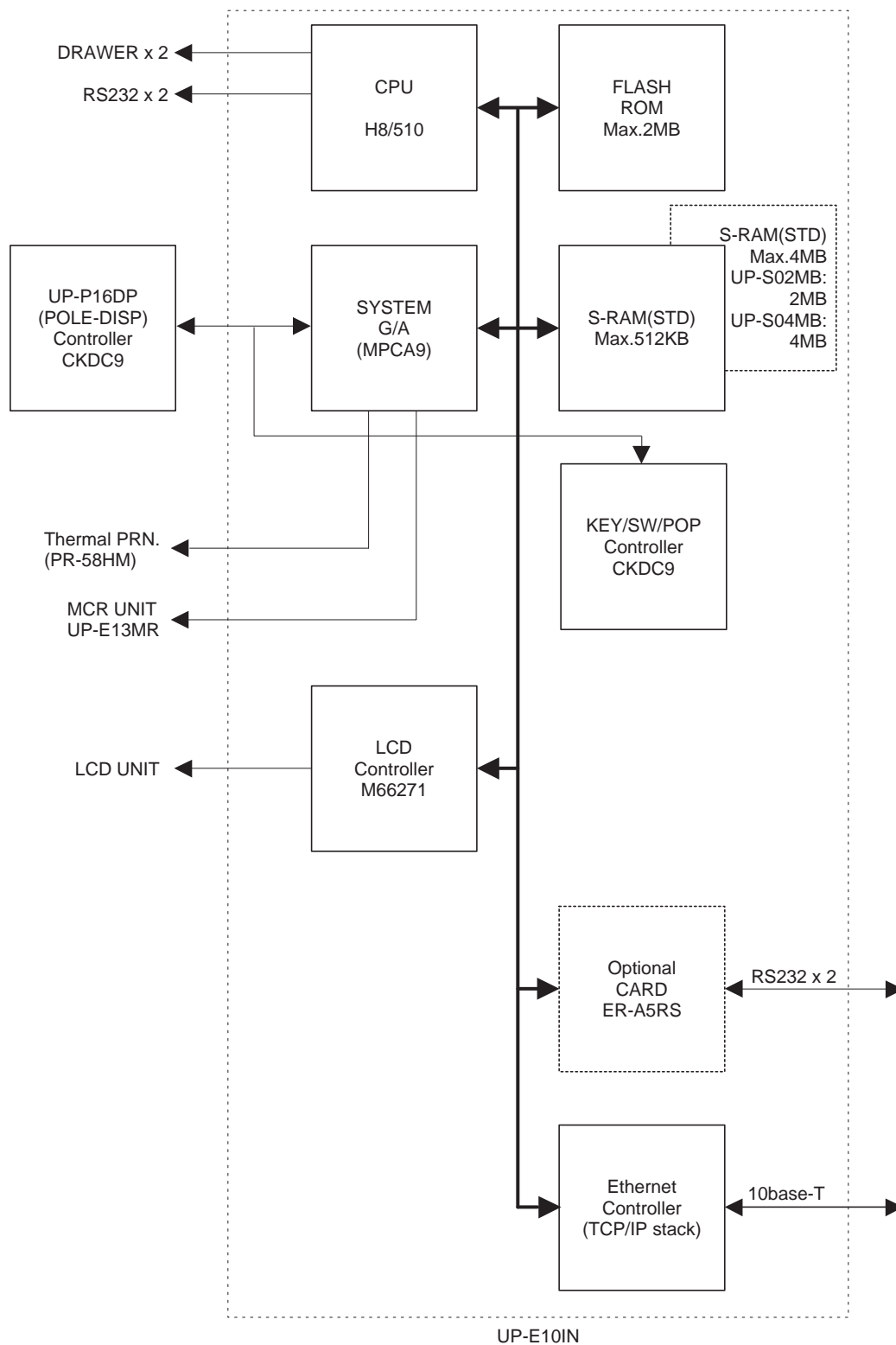
Press the CANCEL key to exit the program.

**7)-3. Drawer 2 Check****① Checking**

The program turns on the drawer 2 solenoid, senses the value of the drawer to open the sensor every 100ms, and displays the operating status. The procedure for displaying the menu and exiting the program are the same as for the drawer 1 check.

## CHAPTER 6. CIRCUIT DESCRIPTION

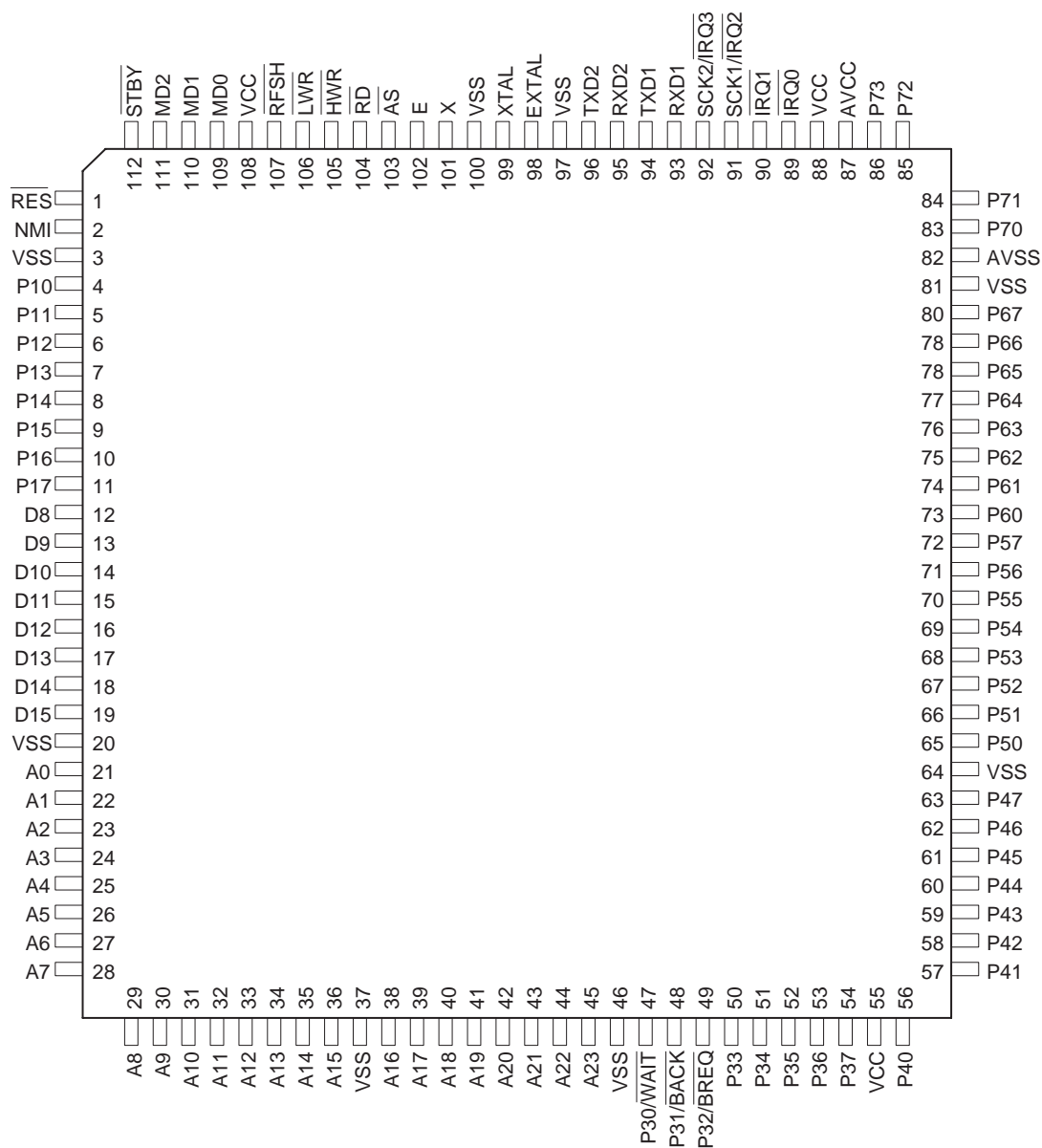
### 1. HARDWARE BLOCK DIAGRAM



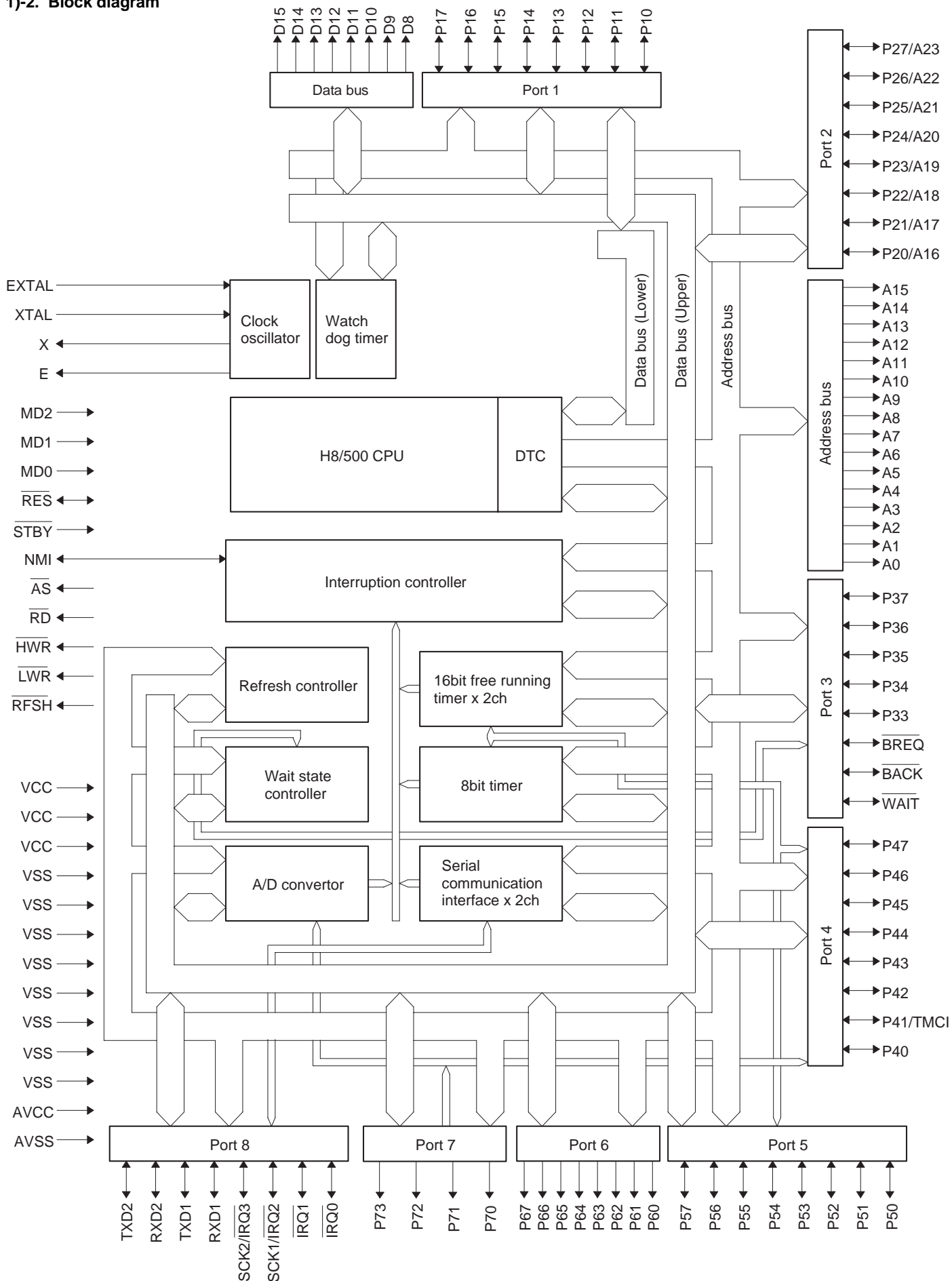
## 2. DESCRIPTION OF MAIN LSI's

### 1) CPU (HD6415108FX)

#### 1)-1. Pin description



## 1)-2. Block diagram



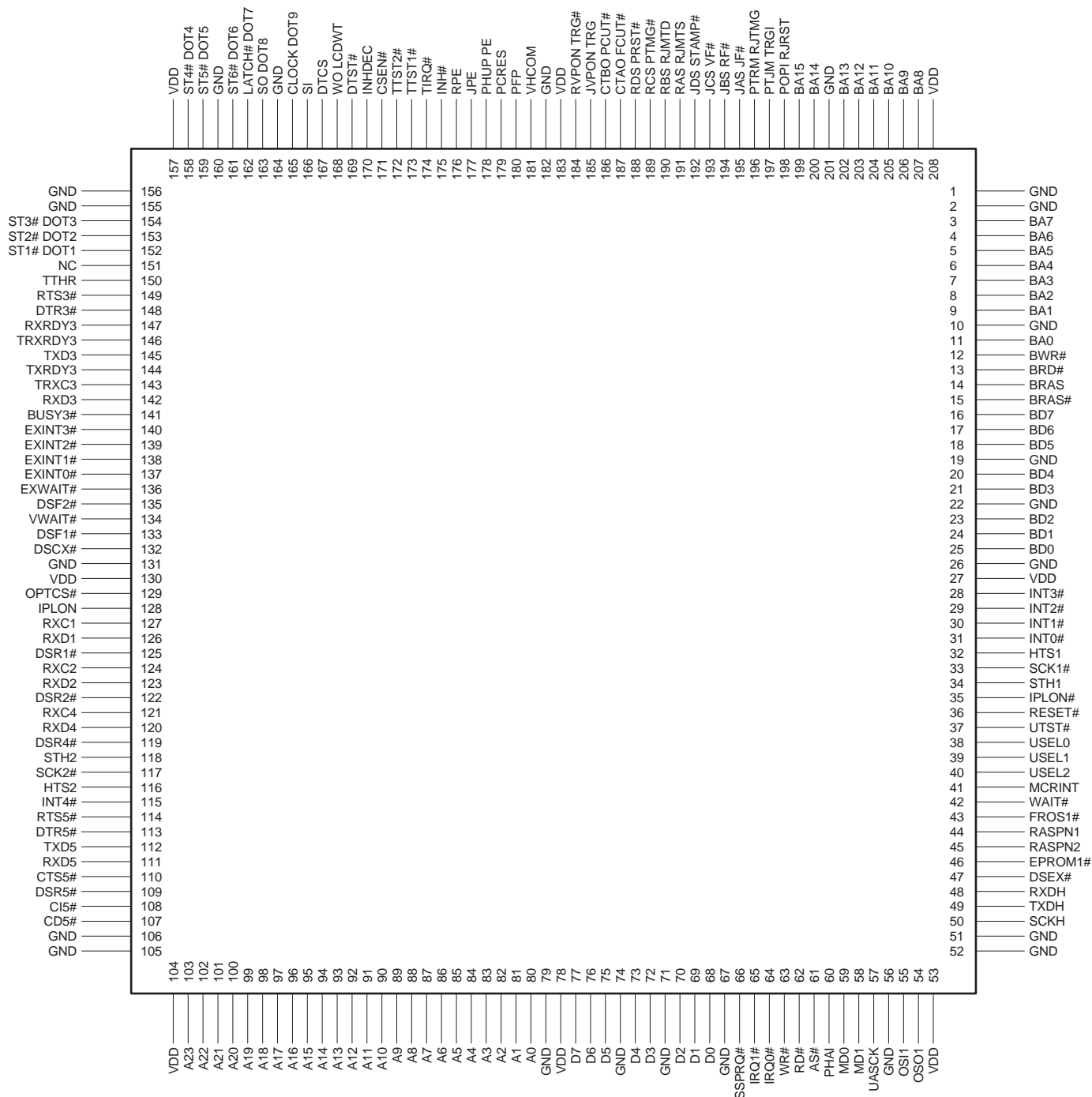
## 1)-3. Pin description

Pin No.	Symbol	Signal name	In/ Out	Function
1	/RES	/RESET	In	Reset signal
2	NMI	NMI	In	Non-maskable interrupt input for SSP interrupt input.
3	VSS	GND	In	GND
4	D0	D0	I/O	Data bus
5	D1	D1	I/O	Data bus
6	D2	D2	I/O	Data bus
7	D3	D3	I/O	Data bus
8	D4	D4	I/O	Data bus
9	D5	D5	I/O	Data bus
10	D6	D6	I/O	Data bus
11	D7	D7	I/O	Data bus
12	D8	D8	I/O	Data bus
13	D9	D9	I/O	Data bus
14	D10	D10	I/O	Data bus
15	D11	D11	I/O	Data bus
16	D12	D12	I/O	Data bus
17	D13	D13	I/O	Data bus
18	D14	D14	I/O	Data bus
19	D15	D15	I/O	Data bus
20	VSS	GND	In	GND
21	A0	A0	Out	Address bus
22	A1	A1	Out	Address bus
23	A2	A2	Out	Address bus
24	A3	A3	Out	Address bus
25	A4	A4	Out	Address bus
26	A5	A5	Out	Address bus
27	A6	A6	Out	Address bus
28	A7	A7	Out	Address bus
29	A8	A8	Out	Address bus
30	A9	A9	Out	Address bus
31	A10	A10	Out	Address bus
32	A11	A11	Out	Address bus
33	A12	A12	Out	Address bus
34	A13	A13	Out	Address bus
35	A14	A14	Out	Address bus
36	A15	A15	Out	Address bus
37	VSS	GND	In	GND
38	A16	A16	Out	Address bus
39	A17	A17	Out	Address bus
40	A18	A18	Out	Address bus
41	A19	A19	Out	Address bus
42	A20	A20	Out	Address bus
43	A21	A21	Out	Address bus
44	A22	A22	Out	Address bus
45	A23	A23	Out	Address bus
46	VSS	GND	In	GND
47	P30	/WAIT	In	Wait signal
48	P31	/BACK	Out	Bus control request acknowledge signal
49	P32	/BREQ	In	Bus control request signal
50	P33	DOPS	In	Drawer open signal
51	P34	/DR0	Out	Option drawer open signal
52	P35	/DR1	Out	Option drawer open signal
53	P36	NC	NC	NC
54	P37	NC	NC	NC
55	VCC	VCC	In	+5V
56	P40	VCC	In	+5V
57	P41	GND	In	GND
58	P42	GND	In	GND

Pin No.	Symbol	Signal name	In/ Out	Function
59	P43	GND	In	GND
60	P44	MCRINT	In	MCR interrupt signal
61	P45	GND	In	GND
62	P46	/SHEN	In	CKDC interface shift enable signal
63	P47	GND	In	GND
64	VSS	GND	In	GND
65	P50	—	Out	/DTR2 : Data Terminal Ready2
66	P51	—	In	/DSR2 : Data Set Ready2
67	P52	—	In	/CTS2 : Clear To Send2
68	P53	—	In	/DCD2 : Carrier Detect2
69	P54	—	In	NC
70	P55	NC	Out	/RTS2:Request To Send2
71	P56	—	In	/CI2:Calling Indicator2
72	P57	/STOP	Out	System reset output signal
73	P60	/IPLON0	In	From IPL SW
74	P61	/IPLON1	In	From IPL SW
75	P62	GND	In	GND
76	P63	NORDY	In	Flash Memory ready ("H" active)
77	P64	FVPON	Out	Flash Memory write protect ("L" active)
78	P65	BANK	Out	For IPL ROM
79	P66	GND	In	GND
80	P67	GND	In	GND
81	VSS	GND	In	GND
82	AVSS	GND	In	GND
83	P70	GND	In	GND
84	P71	GND	In	GND
85	P72	GND	In	GND
86	P73	GND	In	GND
87	AVCC	VCC	In	+5V
88	VCC	VCC	In	+5V
89	/IRQ0	/IRQ0	In	Interrupt signal 0
90	/IRQ1	/IRQ1	In	Interrupt signal 1
91	/IRQ2	UASCK	In	Synchronizing shift clock signal for USART
92	/IRQ3	SCKI	Out	CKDC interface synchronizing shift clock
93	RXD1	/RCVDT2	In	RXD signal for RS232
94	TXD1	TXD2	Out	TXD signal for RS232
95	RXD2	RXDI	In	CKDC interface shift input data
96	TXD2	TXDI	Out	CKDC interface shift output data
97	VSS	GND	In	GND
98	EXTAL	EXTAL	In	Crystal oscillator connection 19.6MHz
99	XTAL	XTAL	In	Crystal oscillator connection 19.6MHz
100	VSS	GND	In	GND
101	X	#	Out	System clock
102	E	NC	NC	NC
103	/AS	/AS	Out	Address strobe
104	RD	/RD	Out	Read signal
105	/HWR	/HWR	Out	Write signal (HIGH)
106	/LWR	/LWR	Out	Write signal (LOW)
107	/RFSH	/RFSH	Out	Refresh cycle signal
108	VCC	VCC	In	+5V
109	MD0	IPLON0	In	From IPL SW
110	MD1	IPLON0	In	From IPL SW
111	MD2	/IPLON0	In	From IPL SW
112	/STBY	VCC	In	+5V

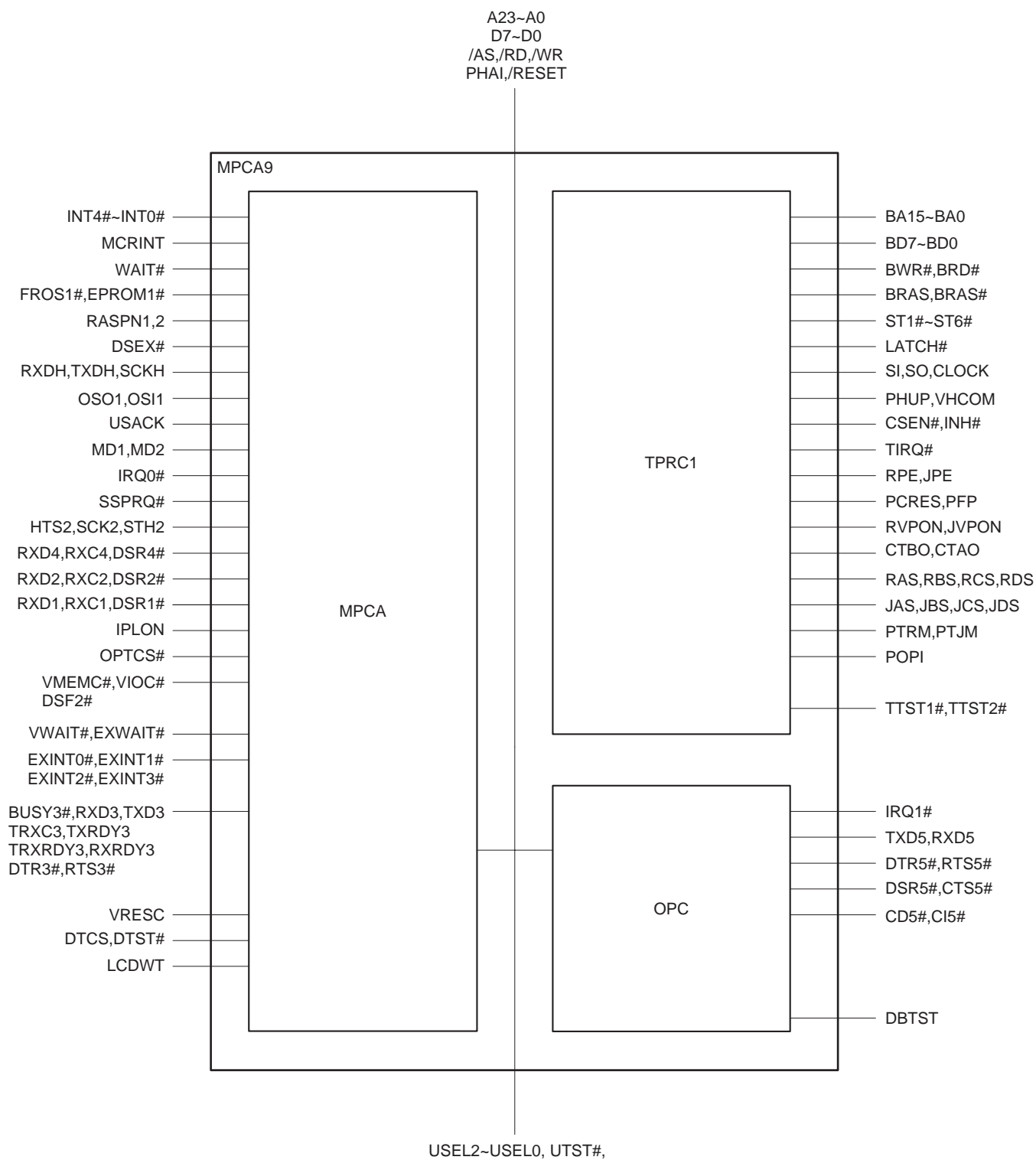
## 2) G.A.(MPCA9)

## 2)-1. Pin configuration





## 2)-2. Block diagram



## 2)-3. Pin description

Pin No.	Name	IN/OUT	Description
1	GND	-	GND
2	GND	-	GND
3	BA7	O	Address bus 7 for PB-RAM
4	BA6	O	Address bus 6 for PB-RAM
5	BA5	O	Address bus 5 for PB-RAM
6	BA4	O	Address bus 4 for PB-RAM
7	BA3	O	Address bus 3 for PB-RAM
8	BA2	O	Address bus 2 for PB-RAM
9	BA1	O	Address bus 1 for PB-RAM
10	GND	-	GND
11	BA0	O	Address bus 0 for PB-RAM
12	BWR#	O	PB-RAM write strobe signal
13	BRD#	O	PB-RAM read strobe signal
14	BRAS	O	PB-RAM chip select : Active High (NU)
15	BRAS#	O	PB-RAM chip select : Active Low
16	BD7	I/O	Data Bus 7 for PB-RAM
17	BD6	I/O	Data Bus 6 for PB-RAM
18	BD5	I/O	Data Bus 5 for PB-RAM
19	GND	-	GND
20	BD4	I/O	Data Bus 4 for PB-RAM
21	BD3	I/O	Data Bus 3 for PB-RAM
22	GND	-	GND
23	BD2	I/O	Data Bus 2 for PB-RAM
24	BD1	I/O	Data Bus 1 for PB-RAM
25	BD0	I/O	Data Bus 0 for PB-RAM
26	GND	-	GND
27	VDD	-	+3.3V
28	INT3#	I	Interrupt signal 3 (NU)
29	INT2#	I	Shift enable for CKDC9
30	INT1#	I	Keyboard request for CKDC9
31	INT0#	I	Power off signal input
32	HTS1	O	8 bit serial port output (for CKDC9)
33	SCK1#	O	Serial port shift clock output (for CKDC9)
34	STH1	I	8 bit serial port input (for CKDC9)
35	IPLON#	I	IPL switch 0 ON signal
36	RESET#	I	MPCA reset
37	UTST#	I	MPCA test pin (+3.3V)
38	USEL0	I	MPCA test pin (GND)
39	USEL1	I	MPCA test pin (GND)
40	USEL2	I	MPCA test pin (GND)
41	MCRINT	O	MCR interrupt signal
42	WAIT#	O	Wait request signal
43	FROS1#	O	Flash ROM 1 chip select signal
44	RASPN1	O	RAM 1 chip select signal
45	RASPN2	O	RAM 2 chip select signal
46	EPROM1#	O	EP-ROM 1 chip select signal
47	DSEX#	O	EP-ROM 2 chip select signal
48	RXDH	O	8 bit serial port output to CPU
49	TXDH	I	8 bit serial port input from CPU
50	SCKH	I	Serial port shift clock input from CPU
51	GND	-	GND
52	GND	-	GND
53	VDD	-	+3.3V
54	OSO1	O	System clock (7.37MHz)

Pin No.	Name	IN/OUT	Description
55	OSI1	I	System clock (7.37MHz)
56	GND	-	GND
57	UASCK	O	USAT clock to CPU
58	MD1	I	MPCA test pin (GND)
59	MD0	I	MPCA test pin (GND)
60	PHAI	I	System clock (9.83MHz)
61	AS#	I	Address strobe
62	RD#	I	Read Strobe
63	WR#	I	Write Strobe
64	IRQ0#	O	Interrupt request 0 to CPU
65	IRQ1#	O	Interrupt request 1 to CPU
66	SSPRQ#	O	SSP interrupt request to CPU
67	GND	-	GND
68	D0	I/O	Data Bus 0
69	D1	I/O	Data Bus 1
70	D2	I/O	Data Bus 2
71	GND	-	GND
72	D3	I/O	Data Bus 3
73	D4	I/O	Data Bus 4
74	GND	-	GND
75	D5	I/O	Data Bus 5
76	D6	I/O	Data Bus 6
77	D7	I/O	Data Bus 7
78	VDD	-	+3.3V
79	GND	-	GND
80	A0	I	Address bus 0
81	A1	I	Address bus 1
82	A2	I	Address bus 2
83	A3	I	Address bus 3
84	A4	I	Address bus 4
85	A5	I	Address bus 5
86	A6	I	Address bus 6
87	A7	I	Address bus 7
88	A8	I	Address bus 8
89	A9	I	Address bus 9
90	A10	I	Address bus 10
91	A11	I	Address bus 11
92	A12	I	Address bus 12
93	A13	I	Address bus 13
94	A14	I	Address bus 14
95	A15	I	Address bus 15
96	A16	I	Address bus 16
97	A17	I	Address bus 17
98	A18	I	Address bus 18
99	A19	I	Address bus 19
100	A20	I	Address bus 20
101	A21	I	Address bus 21
102	A22	I	Address bus 22
103	A23	I	Address bus 23
104	VDD	-	+3.3V
105	GND	-	GND
106	GND	-	GND
107	CD5#	I	RS-232 ch1 CD signal
108	CI5#	I	RS-232 ch1 CI signal

Pin No.	Name	IN/OUT	Description
109	DSR5#	I	RS-232 ch1 DSR signal
110	CTS5#	I	RS-232 ch1 CTS signal
111	RXD5	I	RS-232 ch1 RXD signal
112	TXD5	O	RS-232 ch1 TXD signal
113	DTR5#	O	RS-232 ch1 DTR signal
114	RTS5#	O	RS-232 ch1 RTS signal
115	INT4#	I	Shift enable for option display
116	HTS2	O	8 bit serial port output (for option display)
117	SCK2#	O	Serial port shift clock output (for option display)
118	STH2	I	8 bit serial port input (for option display)
119	DSR4#	I	MCR track 3 CLS signal
120	RXD4	I	MCR track 3 RDD signal
121	RXC4	I	MCR track 3 RCP signal
122	DSR2#	I	MCR track 2 CLS signal
123	RXD2	I	MCR track 2 RDD signal
124	RXC2	I	MCR track 2 RCP signal
125	DSR1#	I	MCR track 1 CLS signal
126	RXD1	I	MCR track 1 RDD signal
127	RXC1	I	MCR track 1 RCP signal
128	IPLON	O	IPL switch 0 ON signal to CPU
129	OPTCS#	O	Chip select base signal for expansion option
130	VDD	-	+3.3V
131	GND	-	GND
132	VMEMC#	O	VRAM chip select signal
133	VIOC#	O	LCDC chip select signal
134	VWAIT#	I	LCDC wait signal
135	DSF2#	O	DPRAM chip select signal
136	EXWAIT#	I	External wait signal
137	EXINT0#	I	External interrupt signal 0
138	EXINT1#	I	External interrupt signal 1
139	EXINT2#	I	External interrupt signal 2
140	EXINT3#	I	External interrupt signal 3
141	BUSY3#	I	Fiscal memory BUZY signal (NU)
142	RXD3	I	Fiscal memory RXD signal (NU)
143	TRXC3	I	Fiscal memory CLOCK signal (NU)
144	TXD3	O	Fiscal memory TXD signal (NU)
145	TXRDY3	O	NU
146	TRXRDY3	O	NU
147	RXRDY3	O	Fiscal memory READY signal (NU)
148	DTR3#	O	Fiscal memory DTR signal (NU)
149	RTS3#	O	Fiscal memory RTS signal (NU)
150	DBTST	I	MPCA test pin (GND)
151	VRESC	O	NU
152	ST1#	O	Thermal head drive strobe signal 1
153	ST2#	O	Thermal head drive strobe signal 2
154	ST3#	O	Thermal head drive strobe signal 3
155	GND	-	GND
156	GND	-	GND
157	VDD	-	+3.3V
158	ST4#	O	Thermal head drive strobe signal 4
159	ST5#	O	Thermal head drive strobe signal 5 (NU)
160	GND	-	GND
161	ST6#	O	Thermal head drive strobe signal 6 (NU)
162	LATCH#	O	Thermal head latch signal

Pin No.	Name	IN/OUT	Description
163	SO	O	Thermal head serial output data
164	GND	-	GND
165	CLOCK	O	Thermal head clock signal
166	SI	I	Thermal head serial return data
167	DTCS	O	Printer control select signal (GND)
168	LCDWT	I	Wait request signal to CPU (+3.3V)
169	DTST#	I	MPCA test pin (+3.3V)
170	INHDEC	I	CSEN# enable signal (GND)
171	CSEN#	I	TPRC chip select (GND)
172	TTST2#	I	MPCA test pin (+3.3V)
173	TTST1#	I	MPCA test pin (+3.3V)
174	TIRQ#	O	TPRC interrupt request
175	INH#	I	Thermal head drive inhibit
176	RPE	I	Receipt paper end signal
177	JPE	I	Journal paper end signal
178	PHUP	I	Printer head up signal
179	PCRES	I	Auto cutter unit reset signal
180	PFP	I	Auto cutter unit FP signal
181	VHCOM	I	Head drive common power control
182	GND	-	GND
183	VDD	-	+3.3V
184	RVPON	O	Receipt side paper feed pulse motor common power control signal
185	JVPON	O	Journal side paper feed pulse motor common power control signal (NU)
186	CTBO	O	Cutter motor control signal
187	CTAO	O	Cutter motor control signal
188	RDS	O	Receipt side paper feed pulse motor drive signal, phase D
189	RCS	O	Receipt side paper feed pulse motor drive signal, phase C
190	RBS	O	Receipt side paper feed pulse motor drive signal, phase B
191	RAS	O	Receipt side paper feed pulse motor drive signal, phase A
192	JDS	O	Journal side paper feed pulse motor drive signal, phase D
193	JCS	O	Journal side paper feed pulse motor drive signal, phase C
194	JBS	O	Journal side paper feed pulse motor drive signal, phase B
195	JAS	O	Journal side paper feed pulse motor drive signal, phase A
196	PTRM	I	Receipt motor connector sens signal
197	PTJM	I	Journal motor connector sense signal
198	POPI	I	GND
199	BA15	O	Address bus 15 for PB-RAM
200	BA14	O	Address bus 14 for PB-RAM
201	GND	-	GND
202	BA13	O	Address bus 13 for PB-RAM
203	BA12	O	Address bus 12 for PB-RAM
204	BA11	O	Address bus 11 for PB-RAM
205	BA10	O	Address bus 10 for PB-RAM
206	BA9	O	Address bus 9 for PB-RAM
207	BA8	O	Address bus 8 for PB-RAM
208	VDD	-	+3.3V

### 3)-1. General description

Keys: The CKDC9 is capable of controlling a maximum of 256 momentary keys. (Sharp 2-key rollover control)  
Simultaneous scanning of key and switch  
(When a key is scanned, the state of a mode and clerk switch is also buffered. The host can scan the state of switch together with the key entry data at the same time the key is scanned.)

Switches: Mode switch with 14 positions maximum  
8-bit clerk (cashier) switch  
2-bit feed switch  
1-bit receipt on/off switch  
1-bit option switch  
4-bit general-purpose switch (1-bit is used for keyboard select)

Displays: 16-column dot display  
12-column 7-segment display (column digit selectable)  
All column blink controlled for the dot and 7-segment display decimal point and indicators  
Programmable patterns for 7-segment display:  
Four patterns  
Internal driver for 7-segment display

Buzzer: Single tone control

Clock: Year, month, day of month, day of week, hour, minute

Alarm: Hour, minute

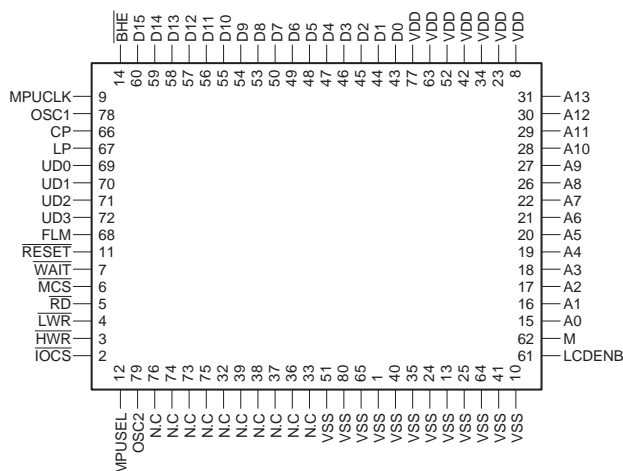
Interrupt request (event control):

Detection of key input, switch position change, alarm issue, and counter overflow

Pin No.	Symbol	Signal name	In/ Out	Function
1	SB	SB	Out	Segment B
2	SC	SC	Out	Segment C
3	SD	SD	Out	Segment D
4	SE	SE	Out	Segment E
5	SF	SF	Out	Segment F
6	SG	SG	Out	Segment G
7	P4	AP	Out	
8	P0	NC	—	NC
9	P1	NC	—	NC
10	P2	DP	Out	Decimal point
11	P3	ID	Out	Indicator
12	MODR	VCC	—	+5V
13	$\overline{\text{CFSR}}$	$\overline{\text{CFSR}}$	In	Clerk key, Feed key, Switch return signal
14	KEX0	NC	Out	NC
15	KEX1	NC	Out	NC
16	RQ	GND	—	GND
17	SKR0	VCC	—	+5V
18	ST0	ST0	Out	Key strobe signal
19	ST1	ST1	Out	Key strobe signal
20	ST2	ST2	Out	Key strobe signal
21	ST3	ST3	Out	Key strobe signal
22	$\overline{\text{POFF}}$	$\overline{\text{POFF}}$	In	Power off signal
23	$\overline{\text{STOP}}$	$\overline{\text{STOP}}$	In	STOP signal
24	DDIG	VCC	—	+5V

Pin No.	Symbol	Signal name	In/ Out	Function
25	DCS	DCS	—	Dot display controller chip select DCS
26	VCC	VCKDC	—	+5V
27	SCK	SCK	In	Clock signal
28	HTS	HTS	In	Key data from host
29	STH	STH	Out	Key data to host
30	SDISP	GND	—	GND
31	BUZZ	BUZZ	Out	Buzzer
32	$\overline{\text{DSCK}}$	$\overline{\text{DSCK}}$	—	Dot display controller SCK
33	$\overline{\text{SRES}}$	$\overline{\text{RESET}}$	Out	Reset signal
34	DS0	DS0	—	Dot display controller SO
35	$\overline{\text{SHEN}}$	$\overline{\text{SHEN}}$	Out	Shift enable signal
36	$\overline{\text{IRQ}}$	$\overline{\text{KRQ}}$	Out	Key request signal
37	KR0	KR0	In	Key return signal
38	KR1	KR1	In	Key return signal
39	KR2	KR2	In	Key return signal
40	KR3	KR3	In	Key return signal
41	RESET	CKDCR	In	CKDC reset signal
42	OSC2	OSC2	—	Clock
43	OSC1	OSC1	—	Clock
44	GND	GND	—	GND
45	CL1	CL1	—	Time clock
46	CL2	CL2	—	Time clock
47	TEST	VCKDC	—	+5V
48	G0	G1	Out	Display digit signal
49	G1	G2	Out	Display digit signal
50	G2	G3	Out	Display digit signal
51	G3	G4	Out	Display digit signal
52	G4	G5	Out	Display digit signal
53	G5	G6	Out	Display digit signal
54	G6	G7	Out	Display digit signal
55	G7	G8	Out	Display digit signal
56	G8	G9	Out	Display digit signal
57	G9	G10	Out	Display digit signal
58	G10	G11	Out	Display digit signal
59	G11	NC	Out	NC
60	PO0	NC		NC
61	PO1	NC		NC
62	PO2	NC	—	NC
63	PO3	NC	—	NC
64	SA	SA	—	Segment A

#### 4)-1. Pin configuration



**4)-2. Pin configuration**

Pin No.	Name	Description
1	VSS	GND
2	IOCS#	Chip select input for control register
3	HWR#	High write strobe input
4	LWR#	Low write strobe input
5	RD#	Read strobe input
6	MCS#	Chip select input for VRAM
7	WAIT#	WAIT output to MPU
8	VDD	+5V
9	MPUCLK	MPU clock
10	VSS	GND
11	RESET#	Reset input
12	MPUSEL	8/16-bit selective input to MPU
13	VSS	GND
14	BHE#	Bus high enable input
15	A0	MPU address bus 0
16	A1	MPU address bus 1
17	A2	MPU address bus 2
18	A3	MPU address bus 3
19	A4	MPU address bus 4
20	A5	MPU address bus 5
21	A6	MPU address bus 6
22	A7	MPU address bus 7
23	VDD	+5V
24	VSS	GND
25	VSS	GND
26	A8	MPU address bus 8
27	A9	MPU address bus 9
28	A10	MPU address bus 10
29	A11	MPU address bus 11
30	A12	MPU address bus 12
31	A13	MPU address bus 13
32	N.C	
33	N.C	
34	VDD	+5V
35	VSS	GND
36	N.C	
37	N.C	
38	N.C	
39	N.C	
40	VSS	GND
41	VSS	GND
42	VDD	+5V
43	D0	MPU data bus 0
44	D1	MPU data bus 1
45	D2	MPU data bus 2
46	D3	MPU data bus 3
47	D4	MPU data bus 4
48	D5	MPU data bus 5
49	D6	MPU data bus 6
50	D7	MPU data bus 7
51	VSS	GND
52	VDD	+5V
53	D8	MPU data bus 8
54	D9	MPU data bus 9

Pin No.	Name	Description
55	D10	MPU data bus 10
56	D11	MPU data bus 11
57	D12	MPU data bus 12
58	D13	MPU data bus 13
59	D14	MPU data bus 14
60	D15	MPU data bus 15
61	LCDENB	LCD (ON/OFF) control signal input
62	M	LCD AC-conversion signal output
63	VDD	+5V
64	VSS	GND
65	VSS	GND
66	CP	Display data transfer clock
67	LP	Display data clutch pulse
68	FLM	FIRST LINE MARKER signal output
69	UD0	LCD display data bus 0
70	UD1	LCD display data bus 1
71	UD2	LCD display data bus 2
72	UD3	LCD display data bus 3
73	N.C	
74	N.C	
75	N.C	
76	N.C	
77	VDD	+5V
78	OSC1	Oscillation input terminal
79	OSC2	Oscillation output terminal
80	VSS	GND

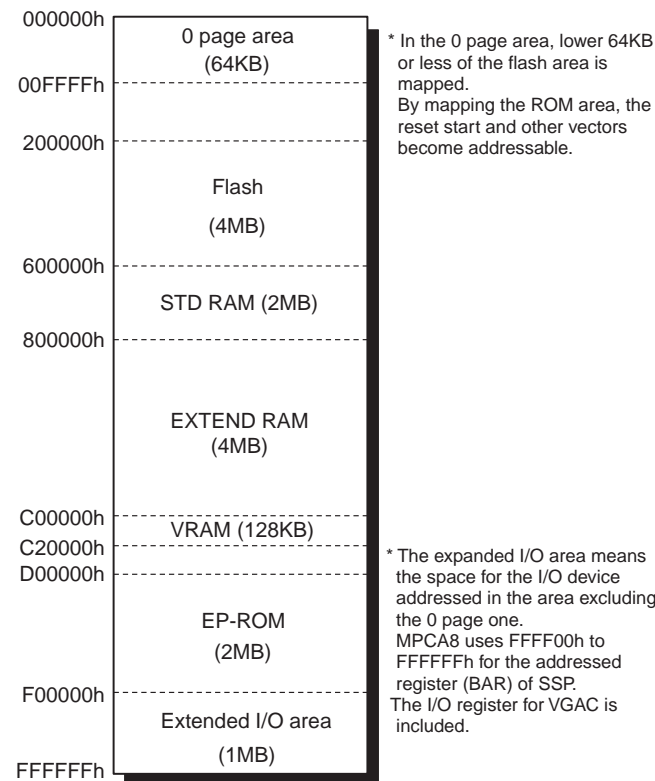
### 3. ADDRESS MAP

#### 1) TOTAL MEMORY SPACE

The address map of the total memory space is shown below. As you can see, the memory space is divided into the following 5 blocks:

0page area (including the I/O area)

- VRAM
- RAM
- ROM
- Extended I/O area

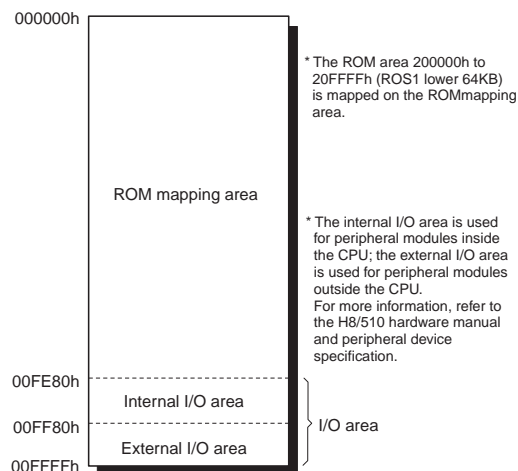


#### 2) 0PAGE AREA

The 0page area consists of four spaces: the ROM mapped area, internal and external I/O areas.

The ROM mapped area has been devised for the following purposes:

- ① Simplifying the procedure for booting the IPL program
- ② Achieving high-speed accessing, and accessing by abbreviated instructions.

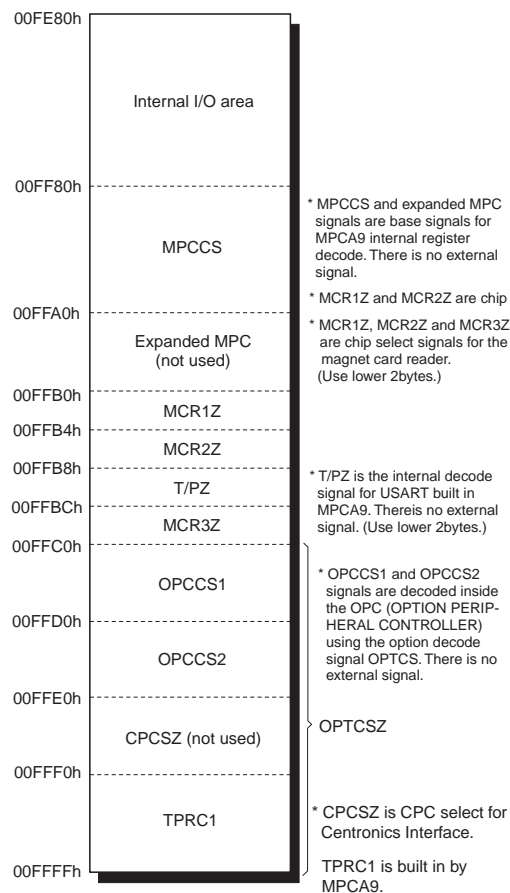


#### 3) I/O AREAS

The addresses from 00FE80h to 00FFFFh are called the internal I/O area.

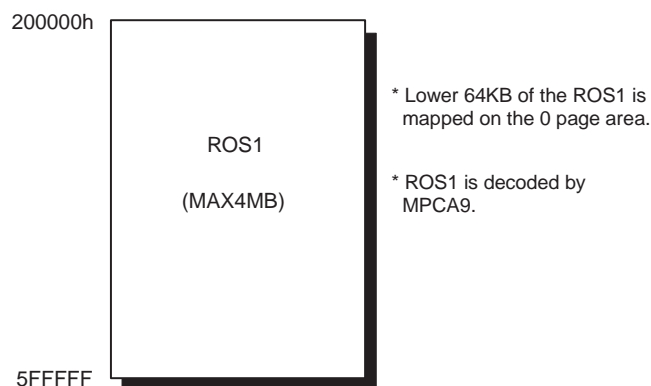
The internal I/O area is a space where the control registers and built-in ports inside the CPU are addressed.

The external I/O area is a space where the peripheral devices outside the CPU or devices on an optional card are addressed.



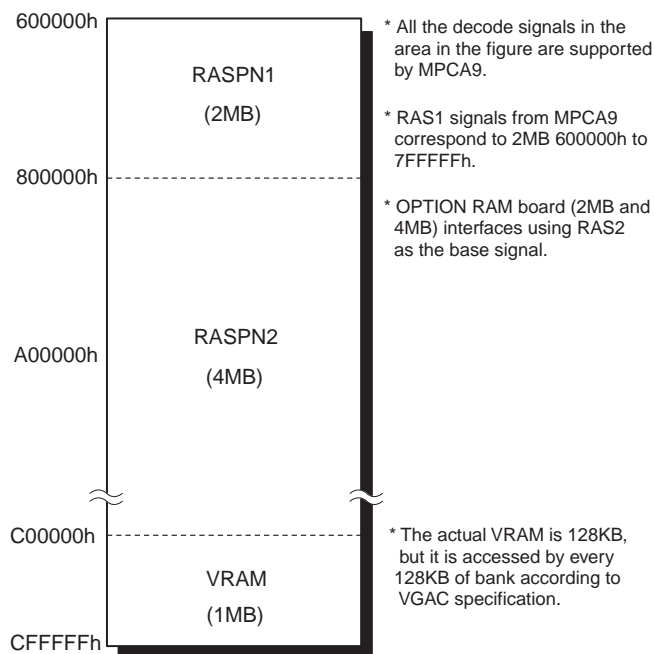
#### 4) ROM SPACE

Fig.5 shows the ROM space. The UP-700 uses 2MB of NOR-type flash memory instead of conventional ROM, so that the FROS1# from the MPCA9 is input into the chip enable of the flash memory.



#### 5) VRAM & RAM SPACE

The VRAM is the display memory of the LCD.



#### 6) EXTENDED I/O AREA

The addresses from F00000h to FFFFFFFh are called an extended I/O area. The UP-700 uses the following addresses as the break address register (BAR) for SSP.

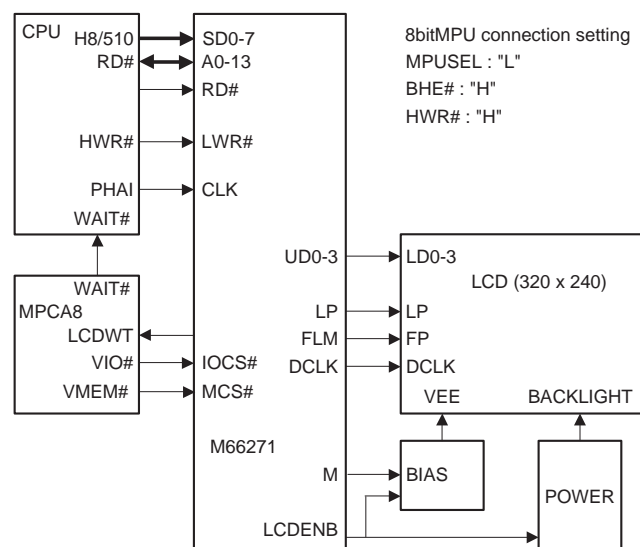
- FFFF00h ~ FFFFFFFh

### 4. LCD DISPLAY

The UP-700 uses a 320 x 240 dot monochromatic LCD for the main display and VGAC (M66271) for the display controller which is connected to H8/510 in the ISA bus connection mode.

#### 1) BLOCK DIAGRAM

Here is the block diagram of the LCD and its allied components.



#### 2) LCD PANEL

The LCD panel uses a dot-matrix liquid crystal module with monochromatic STN and CCFT backlight. The resolution is 320 x 240.

#### 3) DISPLAY CONTROLLER

Matsushita VGAC (M66271) is used for the display controller.

VRAM is present on the address space of the CPU and it is possible to write and read data from the CPU side through the lower 9600 byte address of 128 KB size in addresses C00000H ~ C1FFFFH. C00000H - C1FFFFH:

#### 4) LCD ON CONTROL

The LCD is turned on and off by controlling the bias power supply for the LCD using the terminal LCDENB of the M66271.

LCDENB is in low level when resetting. When bit 0 of the mode resistor of the M66271 by software is set to high level, the power is supplied to the LCD, thus turning on the LCD.

#### 5) BACK LIGHT CONTROL

The backlight ON/OFF is controlled by the same LCDENB used for controlling the LCD ON mode.

#### 6) LUMINANCE AND CONTRAST ADJUSTMENT

- Luminance: Luminance is adjusted with an inverter which controls the dimming function. (Fixed)
- Contrast: Contrast is adjusted by controlling the contrast adjustment voltage (VO) of the LCD.

### 5. CUSTOMER DISPLAY

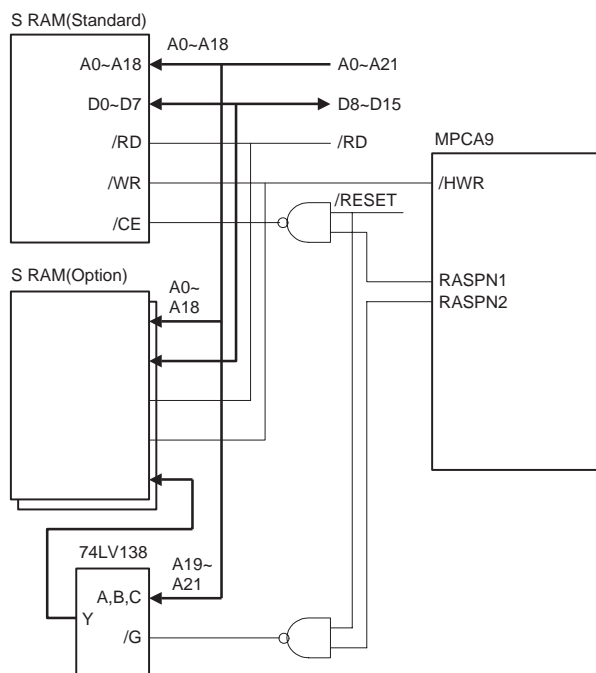
The UP-700 can incorporate a UP-P16DP for the customer display.

### 6. SRAM (Standard)

The device is HYUNDAI 4MB SRAM (HY628400ALLT2-70 512K 8bit) with an access time of 70ns.

## 1) CPU INTERFACE

The figure below shows a typical pseudo SRAM interface in the UP-700.



## 2) SRAM ADDRESS

Standard SRAM is decoded as follows by the RASPN1 signal.

① 780000h ~ 7FFFFFFh

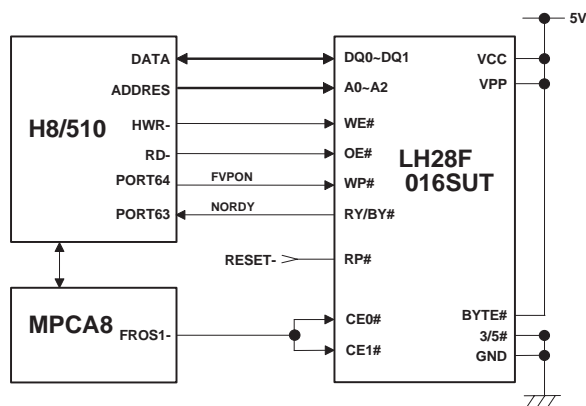
The base signal is 2MB. It thus wraps around with 600000H ~ 7FFFFFFH 1.5MB.

## 7. NOR-type FLASH MEMORY

Here is the explanation for the interface of NOR-type flash memory. The device is Sharp's LH28F016SU flash memory which consists of 512 K words × 16 or 1 MB × 8, with 32 blocks of 64 KB.

### 1) CPU INTERFACE

The figure below shows a typical interface for the LH28F016SU of the UP-700 system.



### 2) DEVICE CONTROL

After resetting, the device automatically enters the array read mode and performs the same action as the usual ROM, thus requiring no special consideration when reading data.

Data can be written at a high speed by using the page buffer.

## 8. SSP CONTROL

The UP-700 uses flash memory in the place of EPROM, so it is possible to rewrite the contents of the flash memory in changing the program. However, since the existing gate array MPCA8 is used, it is also possible to use the conventional SSP.

### 1) OPERATION

Like the MPCA5 ~ 8, the MPCA9 adopts the break address register comparison method for detecting addresses. The operation of this method is briefly explained below.

The gate array always compares the break address register (BAR) built in the gate array, with the address bus to monitor the address bus.

If both agree, the gate array outputs the NMI signal to the CPU, which in turn shifts from normal handling to exception handling.

In both the MPCA5 ~ 8 and the MPCA9, SSP is achieved by the above operation.

The setting of the break address register (BAR) is directly written in the addresses from FFFF00h to FFFFFFh.

## 9. INTERRUPT CONTROL

There are roughly two types of interrupts:

- Internal interrupts: Controlled inside the CPU
- External interrupts: Input into the CPU from outside

### 1) INTERNAL INTERRUPTS

Device interrupts built in the CPU are used for the following applications:

Event factor	Application
SC11	Interrupt source as RS232 : CH8
SC12	Not used (SC1 is used for CKDC interface.)
FRT1 (ICI) (OCRA) (OCRB) (OVF)	INTMCR ~ MCR interrupt (to FT11 terminal)
FRT2 (ICI)	Standard SHEN event (for CKDC)
(OCRA)	Simple IRC timer event
(OCRB)	RS232 timer event
(OVF)	System timer (53 ms)
TMR (CMA) (CMB) (OVF)	
WDT (OVF)	Drawer open timer
A/D	Not used
NMI	SSP request

### 2) EXTERNAL INTERRUPTS

The following types of external interrupts are available:

- NMI (SSP)
- IRQ0 (Standard I/O interrupt)
- IRQ1 (RS232 interrupt)
- IRQ2 (Not Used)
- IRQ3 (Used as SCK terminal)

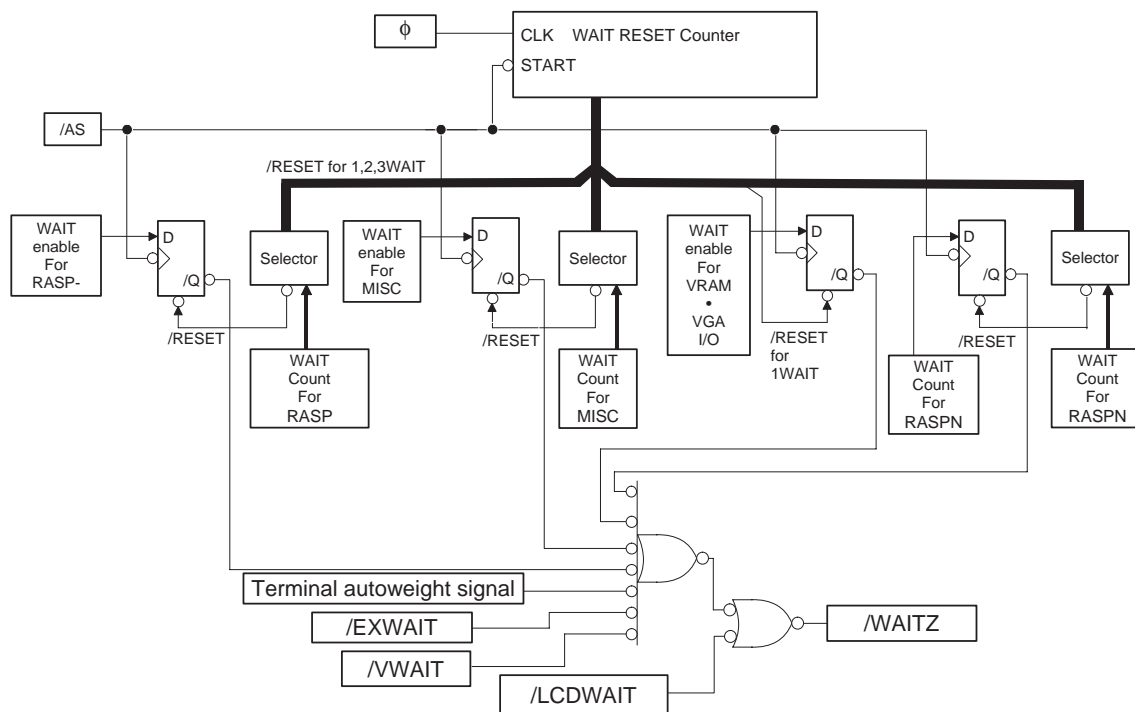


## 10. WAIT CONTROL

The wait control function built in the MPCA9 is used to provide an interface with low-speed devices.

### 1) BLOCK DIAGRAM

The block diagram of the wait control function is shown.



In the figure, the decoder, wait enabling register, AND-OR sections are the same as those in the MPCA6 or 7, but other components are newly incorporated in the MPCA5.

EXWAITZ and WAITZ are external weight signals which are to be ORed inside the MPCA9 and output to the WAITZ. The EXWAITZ is a general-purpose wait request terminal, and WAITZ is the wait request signal from the VGA controller.

## 11. CKDC9

The UP-700 uses one CKDC9 for the CKDC PWB and one CKDC9 for the POLE display (option) to carry out the following control operations.

CKDC PWB CKDC9:

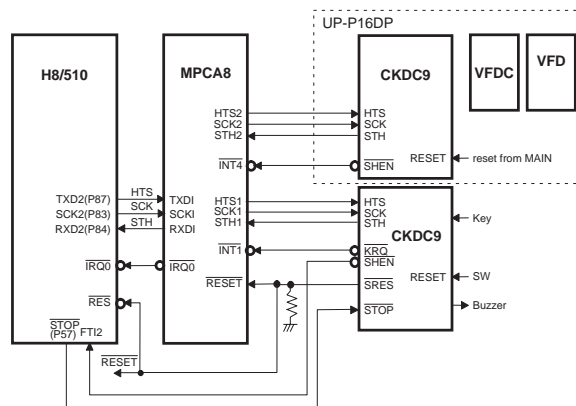
- Clock (second data readable)
- Buzzer
- System reset
- Key/Clerk switch

POLE DISPLAY PWB (UP-P16DP)

- Customer display tube

### 1) INTERFACE

The CKDC9 is connected through the MPCA8.



## 12. OPTION RAM INTERFACE

### 1) INTERFACE

The expanded RAM connector terminals are shown in the table below.

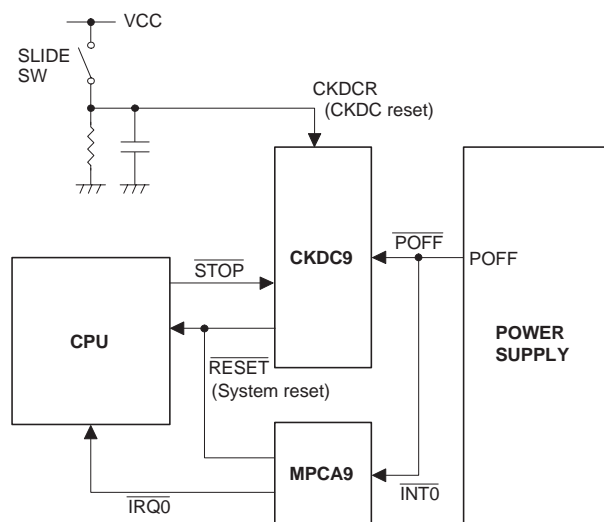
The 40-pin RAM is used for the connector.

Extension RAM connector terminals

Signal Name	Pin No.	Pin No.	Signal Name
+5V	1	2	N.C.
HWR	3	4	N.C.
GND	5	6	A21
A20	7	8	A19
A18	9	10	A17
A16	11	12	A15
A14	13	14	A13
A12	15	16	A11
A10	17	18	A9
A8	19	20	A7
A6	21	22	A5
A4	23	24	A3
A2	25	26	A1
A0	27	28	$\overline{RD}$
D7	29	30	D6
D5	31	32	D4
D3	33	34	D2
D1	35	36	D0
RASPN2	37	38	VCKDC
GND	39	40	GND

## 13. RESET SEQUENCE

The reset sequence block diagram is shown below. Note that the  $\overline{RESET}$  signal (system reset) and CKDCR signal (CKDC reset) are different from each other.



### 1) POWER ON/OFF

The flow of signal processing at the time of the power supply turning On/Off is as follows:

<Power OFF>

Table 19

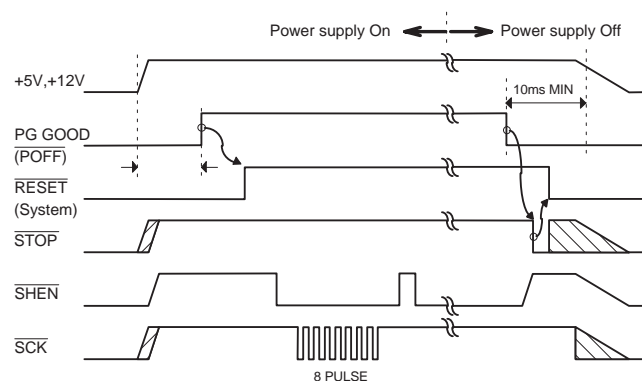
	Power supply	MPCA9	CPU	CKDC9
1	POFF → L			
2		$\overline{IRQ0} \rightarrow L$		
3			STOP → L	
4				$\overline{RESET} \rightarrow L$ (System reset)

<Power ON>

Table 20

	Power supply	MPCA9	CPU	CKDC9
1	POFF → H			
2			STOP → H	
3				$\overline{RESET} \rightarrow H$ (System reset)

The table below shows the timing chart.



## 14. DRAWER

The UP-700 can use up to 2 optional external drawers.

### 1) DRAWER SOLENOID DRIVE

P34 ~ P37 inside the CPU are allocated for the port output of the drawer solenoid drive.

Built-in port	Signal name	Remarks
P34	DR0	Drawer 1 (optional drawer)
P35	DR1	Drawer 2 (optional drawer)
P36	DR2	Reserved
P37	DR3	Reserved

One port corresponds to one drawer. If a power failure is detected, the drawer solenoid drive must be stopped as soon as possible.

\* The drawer solenoid drive time must be controlled in the range of 40 ms to 50 ms by the timer.

### 2) DRAWER OPEN/CLOSE SENSE

The drawer open/close sense signal is input into the built-in port of the CPU. The sense signal of an optional drawer sensor is also wired ORed before inputting.

- P33=1: Any of the drawers is open.

## 15. TCP/IP STACK

The LAN of the UP-700 uses as the protocol Ethernet, which supports TCP/IP.

The interface with the TCP/IP board is achieved through 2 interrupt signals and dual-port RAM.

The decode of dual-port RAM is located in the following space:

DP-RAM: F20000H - F2FFFFH (max. 64 KB)

The interruption from the TCP/IP is allocated as follows:

EXINT0: INTSW (SLAVE WRITE interrupt) bit 6 of 00FF81H

EXINT1: INTSR (SLAVE READ interrupt) bit 0 of 00FF80H

<TCP/IP connector terminals>

Signal Name	Pin No.	Pin No.	Signal Name
+5V	2	1	+5V
+5V	4	3	+5V
A14	6	5	A15
A12	8	7	A13
HWR	10	9	DPCS
A10	12	11	A11
A0	14	13	RD
A2	16	15	A1
A4	18	17	A3
A6	20	19	A5
A8	22	21	A7
D7	24	23	A9
D5	26	25	D6
D3	28	27	D4
D1	30	29	D2
LRES	32	31	D0
INTSW	34	33	INTSR
-	36	35	-
GND	38	37	GND
GND	40	39	GND

## 16. RS232

Two standard RS232 channels are compatible with the ER-A5RS. However, while the ER-A5RS uses the IRQ2 terminal of the CPU for interruption of the RS232, the UP-700 cannot use the IRQ1 terminal instead of it. (The IRQ2 terminal is used for IR as the SCK1 terminal.) The standard RS232 is fixed to the logic channels 1 and 8. Use the channels 2, 3, 4, 5, 6 and 7 for the ER-A5RS.

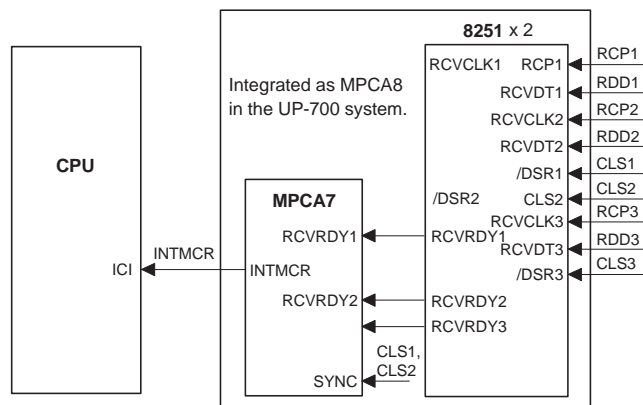
## 17. MCR

This paragraph describes the MCR option (UP-E13MR) control defined by the UP-700 hardware architecture.

3 channels of the serial port (interchangeable with 8251) built in the MPCA9 are used. 3 tracks of data are read simultaneously. (UP-E13MR)

### 1) CPU INTERFACE

The CPU interface for the USART (8251) and magnetic card reader (MCM-21) in the UP-700 system is shown below.



Signal description

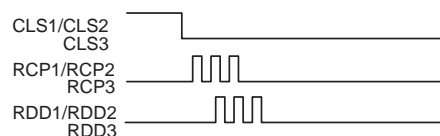
RCP1	TRACK 1 CLOCK PULSE
RDD1	TRACK 1 DATA SIGNAL
RCP2	TRACK 2 CLOCK PULSE
RDD2	TRACK 2 DATA SIGNAL
RCP3	TRACK 3 CLOCK PULSE
RCD3	TRACK 3 DATA SIGNAL
CLS1	TRACK 1 CARD DETECTION SIGNAL
CLS2	TRACK 2 CARD DETECTION SIGNAL
CLS3	TRACK 3 CARD DETECTION SIGNAL
RCVRDY1	TRACK 1 DATA RECEIVING SIGNAL
RCVRDY2	TRACK 2 DATA RECEIVING SIGNAL
RCVRDY3	TRACK 3 DATA RECEIVING SIGNAL
INTMCR	INTERRUPT SIGNAL OR-SYNTHESIZED from RCVRDY and SYNC input

2 chip select signals for the 8251 are generated inside MPCA8.

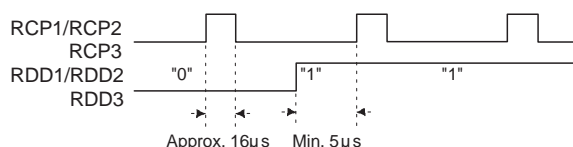
### 2) MCR INTERFACE

The operating timing of the MCR interface signals is given below.

(1) Example of timing



(2) Detailed timing (relation between DATA and CLOCK PULSE)



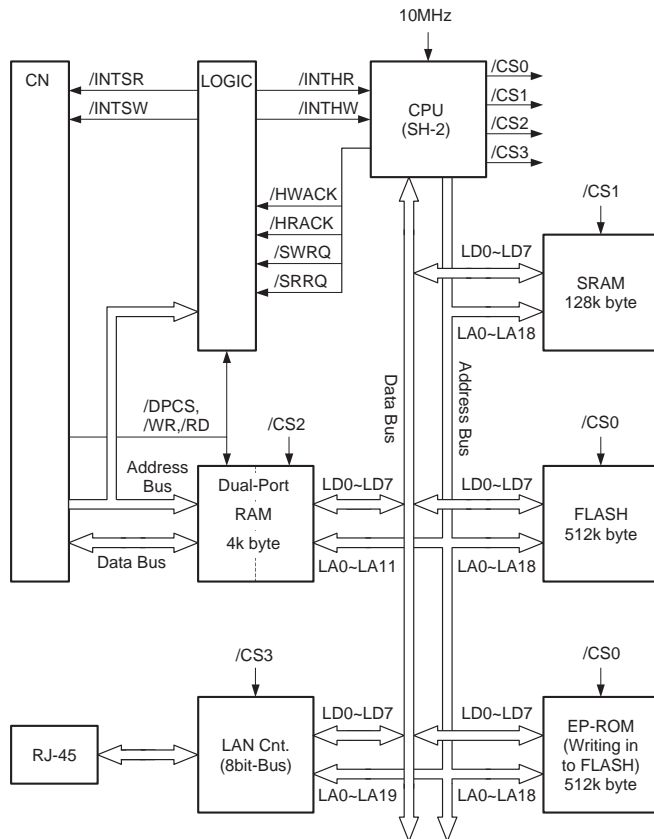
The "NULL" CODE is basically written prior to the opening code. The opening code detection algorithm is considered because data may become corrupt before and after the CARD detection signal due to a worn magnet stripe.

## CHAPTER 7. TCP/IP I/F PWB DESCRIPTION

### 1. GENERAL DESCRIPTION

This control board is an Ethernet board that supports the TCP/IP protocol.

### 2. BLOCK DIAGRAM



\* When writing data into FLASH, switch /CS0to EP-ROM and /CS3 to FLASH Memory.

### 3. CONFIGURATION

#### ① CPU : [HitachiSH-2 Series SH7014 (20MHz)]

As external memory spaces, CS0 - CS3 and DRAM space are provided. This board assigns FLASH Memory to CS0, SRAM to CS1, dual-port SRAM to CS2, and LAN controller to CS3.

#### ② LAN Controller : [RealtekRTL8019AS(20MHz)]

LAN controller is assigned to CS space.

Because of pseudo ISA connection, each register is assigned to addresses of H00C00300 and after.

#### ③ ROM(FLASH Memory) : [SharpLH28F004BVT(4Mbits)]<Access Time = 90ns>

ROM (FLASH Memory) is assigned to CS0 space.

Data is written onto FLASH Memory from UV-EPROM by switching the CS0 space to UV-EPROM and the CS3 space to FLASH Memory.

MAC Address is written on FLASH Memory.

- Company code is assigned to "08001FH".
- The serial number and adjustment byte are stored in an area of 4 bytes from the address H'0007C000.  
<The serial number is acquired according to Sharp's in-house specification(SS).>

#### ④ RAM : [S-RAM 1Mbits]<Access Time=70ns>

Assigned to CS1 space.

#### [IDT Dual-Port SRAM IDT7134]<Access Time=55ns>

Assigned to CS2 space.

The IDT7134 does not have any LOGICiBusy or Semaphorej, access to the same address from both sides is inhibited.

#### ⑤ Pulse Trans : [Pulse78Z034]

It is used for the 10Base-T standard and has a choke coil built in at the output side.

## 4. MAIN LSI DESCRIPTION

### 1) CPU (SH7014)

#### 1)-1. SH7014 Overview

The SH7014 CMOS single-chip microprocessors integrate a Hitachi-original architecture, high-speed CPU with peripheral functions required for system configuration.

The CPU has a RISC-type instruction set. Most instructions can be executed in one clock cycle, which greatly improves instruction execution speed. In addition, the 32-bit internal-bus architecture enhances data processing power. With this CPU, it has become possible to assemble low cost, high performance/high-functioning systems, even for applications that were previously impossible with microprocessors, such as real-time control, which demands high speeds. In particular, the SH7040 series has a 1-kbyte on-chip cache, which allows an improvement in CPU performance during external memory access.

In addition, this LSI includes on-chip peripheral functions necessary for system configuration, such as large-capacity ROM (except the SH7014, which is ROMless) and RAM, timers, a serial communication interface (SCI), an A/D converter, an interrupt controller, and I/O ports. Memory or peripheral LSIs can be connected efficiently with an external memory access support function.

This greatly reduces system cost.

#### 1)-1-1. SH7014 Features

##### CPU:

- Original Hitachi architecture
- 32-bit internal data bus
- General-register machine
  - Sixteen 32-bit general registers
  - Three 32-bit control registers
  - Four 32-bit system registers
- RISC-type instruction set
  - Instruction length: 16-bit fixed length for improved code efficiency
  - Load-store architecture (basic operations are executed between registers)
  - Delayed branch instructions reduce pipeline disruption during branch
  - Instruction set based on C language
- Instruction execution time: one instruction/cycle (35 ns/instruction at 28.7-MHz operation)
- Address space: Architecture supports 4 Gbytes
- On-chip multiplier: multiplication operations (32 bits x 32 bits → 64 bits) and multiplication/accumulation operations (32 bits x 32 bits + 64 bits → 64 bits) executed in two to four cycles
- Five-stage pipeline

##### Cache Memory:

- 1-kbyte instruction cache
- Caching of instruction codes and PC relative read data
- 4-byte line length (1 longword: 2 instruction lengths)
- 256 entry cache tags
- Direct map method
- On-chip RAM, and on-chip I/O areas not objects of cache
- Used in common with on-chip RAM; 2 kbytes of on-chip RAM used as address array/data array when cache is enabled

##### Interrupt Controller (INTC):

- Seven external interrupt pins (NMI,  $\overline{IRQ} \times 6$ )
- Twenty-eight internal interrupt sources
- Sixteen programmable priority levels

##### Bus State Controller (BSC):

- Supports external extended memory access
  - 8-bit, or 16-bit external data bus
- Memory address space divided into five areas (four areas of SRAM space, one area of DRAM space) with the following settable features:
  - Number of wait cycles
  - Outputs chip-select signals for each area
  - During DRAM space access:
    - Outputs  $\overline{RAS}$  and  $\overline{CAS}$  signals for DRAM
    - Can generate a RAS precharge time assurance  $T_p$  cycle
- DRAM burst access function
  - Supports high-speed access mode for DRAM
- DRAM refresh function
  - Programmable refresh interval
  - Supports CAS-before-RAS refresh and self-refresh modes
- Wait cycles can be inserted using an external WAIT signal
- Address data multiplex I/O devices can be accessed

Note: No bus release

##### Direct Memory Access Controller (DMAC) (2 Channels):

- Supports cycle-steal and burst transfers
- Supports single address mode and dual address mode transfers
- Priority order: fixed at channel 0 > channel 1
- Transfer counter: 16 bits
- Transfer request sources: external DREQ input, auto-request, and on-chip supporting modules
- Address space: 4 Gbytes
- Choice of 8-, 16-, or 32-bit transfer data size

##### Multifunction Timer/Pulse Unit (MTU) (3 Channels):

- Maximum 8 types of waveform output or maximum 16 types of pulse I/O processing possible based on 16-bit timer, 3 channels
- 8 dual-use output compare/input capture registers
- 8 independent comparators
- 8 types of counter input clock
- Input capture function
- Pulse output mode
  - One shot, toggle, PWM

- Phase calculation mode
  - 2-phase encoder calculation processing

### Compare Match Timer (CMT) (Two Channels):

- 16-bit free-running counter
- One compare register
- Generates an interrupt request upon compare match

### Watchdog Timer (WDT) (One Channel):

- Watchdog timer or interval timer
- Count overflow can generate an internal reset, external signal, or interrupt

### Serial Communication Interface (SCI) (Two Channels):

**(Per Channel):**

- Asynchronous or clock-synchronous mode is selectable
- Can transmit and receive simultaneously (full duplex)
- On-chip dedicated baud rate generator
- Multiprocessor communication function

### I/O Ports:

- SH7014
  - Input/output: 35
  - Input: 8
  - Total: 43

**A/D Converter:**

- 10 bits 8 channels
- The SH7014 has a high-speed A/D converter.

### On-Chip Memory:

- ROM
  - SH7014: ROMless
- RAM: SH7014: 3 kbytes (1 kbyte when cache is used)

### Operating Modes:

- Operating modes
  - Non-extended ROM mode
- Processing states
  - Program execution state
  - Exception processing state
- Power-down modes
  - Sleep mode
  - Software standby mode

### Clock Pulse Generator (CPG):

- On-chip clock pulse generator
  - On-chip clock-doubling PLL circuit

### 1)-2. Block Diagram

Figure 1. is a block diagram of the SH7014.

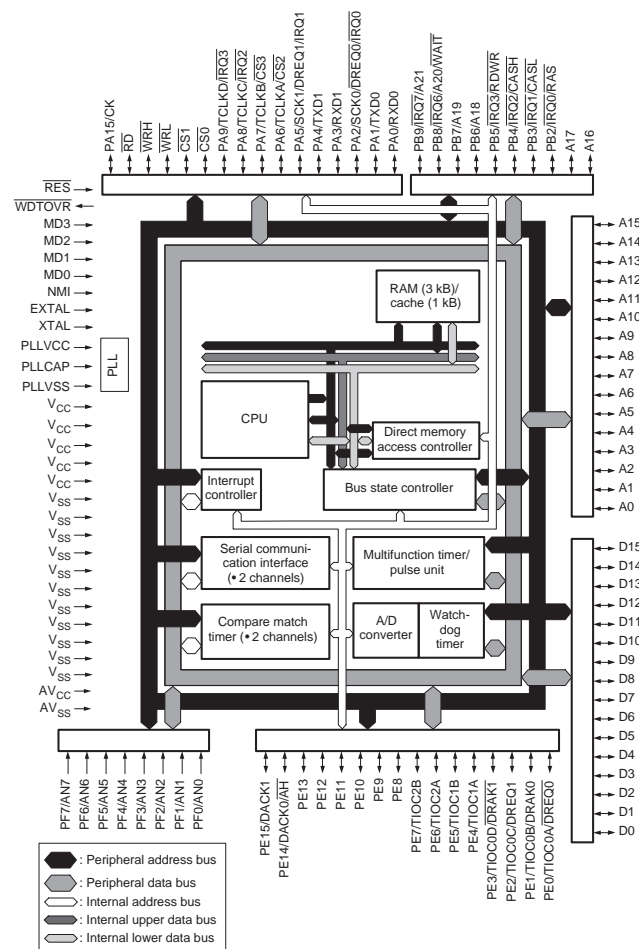


Figure 1. Block Diagram of the SH7014

### 1)-3. Pin Arrangement and Pin Functions

### 1)-3-1. Pin Arrangement

Figure 2. shows the pin arrangement for the SH7014 (top view).

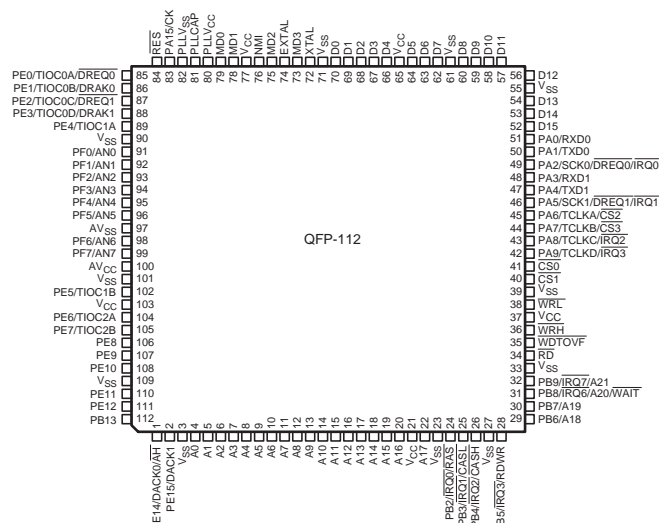


Figure 2. SH7014 Pin Arrangement (QFP-112 Top View)

## CPU

No.	CPU	Signal name	I/O	Remarks
1	PE14	PE14	I	N.U. (GND)
2	PE15	/WP	I	FLASH write Status
3	Vss	GND		
4	A0	LA0	O	Address Bus
5	A1	LA1	O	
6	A2	LA2	O	
7	A3	LA3	O	
8	A4	LA4	O	
9	A5	LA5	O	
10	A6	LA6	O	
11	A7	LA7	O	
12	A8	LA8	O	
13	A9	LA9	O	
14	A10	LA10	O	
15	A11	LA11	O	
16	A12	LA12	O	
17	A13	LA13	O	
18	A14	LA14	O	
19	A15	LA15	O	
20	A16	LA16	O	
21	Vcc	+5V		
22	A17	LA17	O	Address Bus
23	Vss	GND		
24	/IRQ0	/INTHW	I	Host write end interrupt
25	/IRQ1	/INTHR	I	Host write end interrupt
26	/IRQ2	/INTLAN	I	Interrupt from LANC
27	Vss	GND		
28	/IRQ3	/IRQ3	I	N.U. (+5V)
29	A18	LA18	O	Address Bus
30	A19	LA19	O	Address Bus
31	/WAIT	IOCHRDY	I	Wait from LANC
32	PB9	PB9	I	N.U. (GND)
33	Vss	GND		
34	/RD	/MRD	O	Memory Read
35	/WDTOVF	/WDTOVF	O	N.U. (OPEN)
36	/WRH	/WRH	O	N.U. (OPEN)
37	Vcc	+5V		
38	/WRL	/MWE	O	Memory Write
39	Vss	GND		
40	/CS1	/CS1	O	SRAM Chip Select
41	/CS0	/CS0	O	FLASH Chip Select
42	PA9	PA9	I	N.U. (GND)
43	PA8	PA8	I	N.U. (GND)
44	/CS3	/CS3	O	LANC Chip Select
45	/CS2	/CS2	O	DP-RAM Chip Select
46	PA5	PA5	I	N.U. (GND)
47	PA4	PA4	I	N.U. (GND)
48	PA3	PA3	I	N.U. (GND)
49	PA2	PA2	I	N.U. (GND)
50	PA1	PA1	I	N.U. (GND)
51	PA0	PA0	I	N.U. (GND)
52	D15	HD15	I/O	N.U. (Pull-Down)
53	D14	HD14	I/O	N.U. (Pull-Down)
54	D13	HD13	I/O	N.U. (Pull-Down)
55	Vss	GND		
56	D12	HD12	I/O	N.U. (Pull-Down)
57	D11	HD11	I/O	N.U. (Pull-Down)
58	D10	HD10	I/O	N.U. (Pull-Down)
59	D9	HD9	I/O	N.U. (Pull-Down)
60	D8	HD8	I/O	N.U. (Pull-Down)

No.	CPU	Signal name	I/O	Remarks
61	Vss	GND		
62	D7	HD7	I/O	DATA Bus
63	D6	HD6	I/O	
64	D5	HD5	I/O	
65	Vcc	+5V		
66	D4	HD4	I/O	DATA Bus
67	D3	HD3	I/O	
68	D2	HD2	I/O	
69	D1	HD1	I/O	
70	D0	HD0	I/O	
71	Vss	GND		
72	XTAL	XTAL	O	Oscillator connection terminal
73	MD3	MD3	I	Mode terminal
74	EXTAL	EXTAL	I	Oscillator connection terminal
75	MD2	MD2	I	Mode terminal 2
76	NMI	NMI	I	N.U. (+5V)
77	Vcc	+5V		
78	MD1	MD1	I	Mode terminal 1
79	MD0	MD0	I	Mode terminal 0
80	PLLVcc	PLLVcc		
81	PLLCAP	PLLCAP		
82	PLLVss	PLLVss		
83	PA15	PA15	I	N.U. (Pull-Down)
84	/RES	/LRES	I	Hardware Reset
85	PE0	PE0	I	N.U. (GND)
86	PE1	PE1	I	N.U. (GND)
87	PE2	PE2	I	N.U. (GND)
88	PE3	PE3	I	N.U. (GND)
89	PE4	PE4	I	N.U. (GND)
90	Vss	GND		
91	PF0	PF0	I	N.U. (GND)
92	PF1	PF1	I	N.U. (GND)
93	PF2	PF2	I	N.U. (GND)
94	PF3	PF3	I	N.U. (GND)
95	PF4	PF4	I	N.U. (GND)
96	PF5	PF5	I	N.U. (GND)
97	AVss	GND		
98	PF6	PF6	I	N.U. (GND)
99	PF7	PF7	I	N.U. (GND)
100	AVcc	+5V		
101	Vss	GND		
102	PE5	PE5	I	N.U. (GND)
103	Vcc	+5V		
104	PE6	PE6	I	N.U. (GND)
105	PE7	PE7	I	N.U. (GND)
106	PE8	/SRRQ	O	Slave read end request
107	PE9	/SWRQ	O	Slave write end request
108	PE10	/HRACK	O	Host read interrupt cancel
109	Vss	GND		
110	PE11	/HWACK	O	Host write interrupt cancel
111	PE12	PE12	O	N.U. (OPEN)
112	PE13	/RSTDRV	O	Soft Reset for LANC

Note: Signals prefixed with a slash "/" are active in low level.

## 2) LAN CONTROLLER (RTL8019AS)

### 2)-1. Features:

- 100-pin PQFP
- Supports PnP auto detect mode
- Compliant to Ethernet II and IEEE802.3 10Base5, 10Base2, 10BaseT
- Software compatible with NE2000 on both 8 and 16-bit slots
- Supports both jumper and jumperless modes
- Supports Microsofts Plug and Play configuration for jumperless mode
- Supports Full-Duplex Ethernet function to double channel bandwidth
- Supports three level power down modes:
  - Sleep
  - Power down with internal clock running
  - Power down with internal clock halted
- Built-in data prefetch function to improve performance
- Supports UTP, AUI & BNC auto-detect
- Supports auto polarity correction for 10BaseT
- Supports 8 IRQ lines
  - and extra I/O address fully decode mode
- Supports 16K, 32K, 64K and 16K-page mode access to BROM (up to 256 pages with 16K bytes/page)
- Supports BROM disable command to release memory after remote boot
- Supports flash memory read/write
- 16k byte SRAM built in
- Uses a 9346 (64\*16-bit EEPROM) to store resource configurations and ID parameters
- Capable of programming blank 9346 on board for manufacturing convenience
- Support 4 diagnostic LED pins with programmable outputs

### 2)-2. General Description

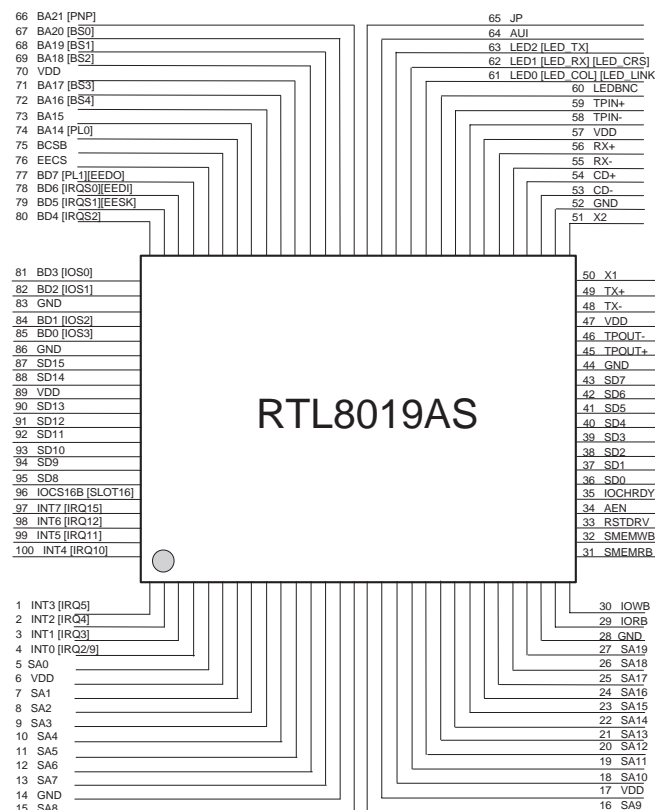
The RTL8019AS is a highly integrated Ethernet Controller which offers a simple solution to implement a Plug and Play NE2000 compatible adapter with full-duplex and power down features.

With the three level power down control features, the RTL8019AS is made to be an ideal choice of the network device for a GREEN PC system. The full-duplex function enables simultaneously transmission and reception on the twisted-pair link to a full-duplex Ethernet switching hub. This feature not only increases the channel bandwidth from 10 to 20 Mbps but also avoids the performance degrading problem due to the channel contention characteristics of the Ethernet CSMA/CD protocol.

The RTL8019AS provides the auto-detect capability between the integrated 10BaseT transceiver, BNC and AUI interface. Besides, the 10BaseT transceiver can automatically correct the polarity error on its receiving pair.

The RTL8019AS is built in with 16K-byte SRAM in a single chip. It is designed not only to provide more friendly functions but also to save the effort of SRAM sourcing and inventory.

## 2)-3. Pin Configuration



### LAN Controller

No.	CPU	Signal name	I/O	Remarks
1	INT3	INT3	O	N.U. (Pull-Down)
2	INT2	INT2	O	N.U. (Pull-Down)
3	INT1	INT1	O	N.U. (Pull-Down)
4	INT0	/INTLAN	O	Interrupt to CPU
5	SA0	LA0	I	Address Bus
6	VDD	+5V		
7	SA1	LA1	I	Address Bus
8	SA2	LA2	I	
9	SA3	LA3	I	
10	SA4	LA4	I	
11	SA5	LA5	I	
12	SA6	LA6	I	
13	SA7	LA7	I	
14	GND	GND		
15	SA8	LA8	I	Address Bus
16	SA9	LA9	I	
17	VDD	+5V		
18	SA10	LA10	I	Address Bus
19	SA11	LA11	I	
20	SA12	LA12	I	
21	SA13	LA13	I	
22	SA14	LA14	I	
23	SA15	LA15	I	
24	SA16	LA16	I	
25	SA17	LA17	I	
26	SA18	LA18	I	
27	SA19	LA19	I	
28	GND	GND		
29	IORB	/MRD	I	Memory Read

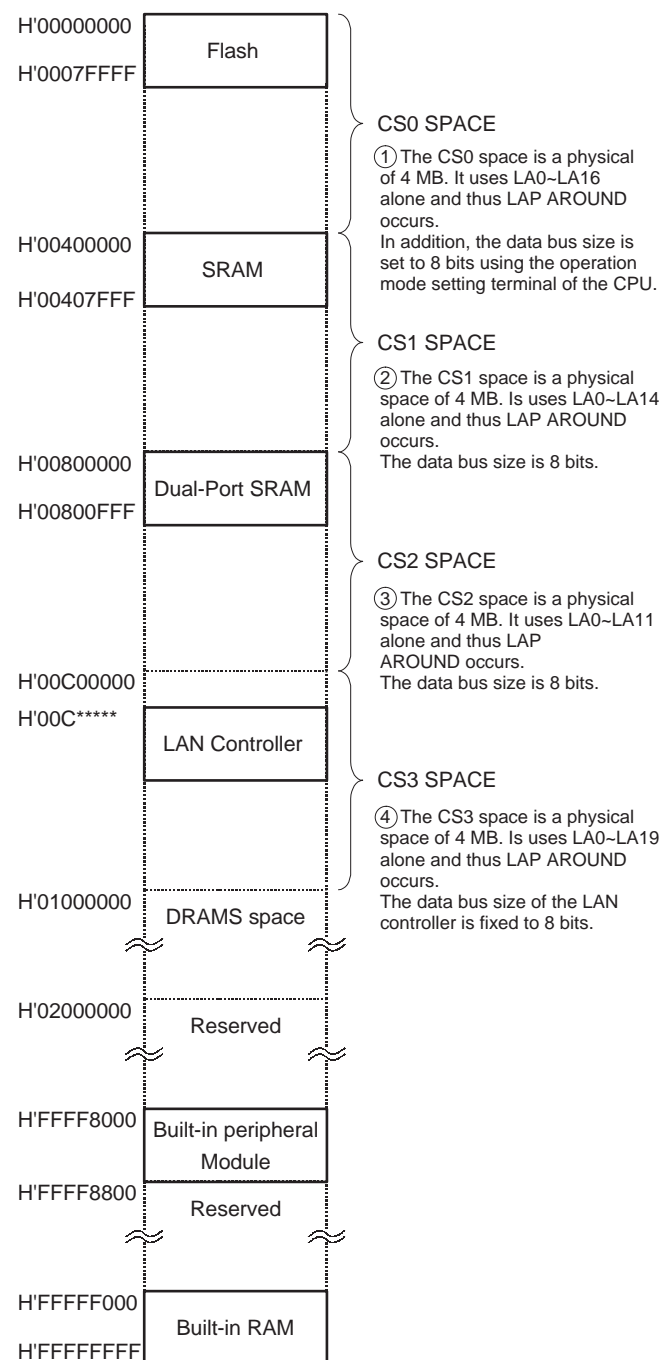


No.	CPU	Signal name	I/O	Remarks
30	IOWB	/MWE	I	Memory Write
31	SMEMRB	SMEMRB	I	N.U. (Pull-Up)
32	SMEMWB	SMEMWB	I	N.U. (Pull-Up)
33	RSTDRV	RSTDRV	I	Hardware Reset
34	AEN	/CS3	I	Chip Select
35	IOCHRDY	/WAIT	O	Wait to CPU
36	SD0	LD0	I/O	DATA Bus
37	SD1	LD1	I/O	
38	SD2	LD2	I/O	
39	SD3	LD3	I/O	
40	SD4	LD4	I/O	
41	SD5	LD5	I/O	
42	SD6	LD6	I/O	
43	SD7	LD7	I/O	
44	GND	GND		
45	TPOUT+	TPOUT+	O	10Base-T output +
46	TPOUT-	TPOUT-	O	10Base-T output -
47	VDD	+5V		
48	TX-	TX-	O	N.U. (Pull-Down)
49	TX+	TX+	O	N.U. (Pull-Down)
50	X1	X1	I	Oscillator connection terminal
51	X2	X2	O	Oscillator connection terminal
52	GND	GND		
53	CD-	CD-	I	N.U. (OPEN)
54	CD+	CD+	I	N.U. (OPEN)
55	RX-	RX-	I	N.U. (OPEN)
56	RX+	RX+	I	N.U. (OPEN)
57	VDD	+5V		
58	TPN-	TPIN-	I	10Base-T input -
59	TPN+	TPIN+	I	10Base-T input +
60	LEDBNC	LEDBNC	O	N.U. (OPEN)
61	LED0	LED0	O	N.U. (OPEN)
62	LED1	LED1	O	N.U. (OPEN)
63	LED2	LED2	O	N.U. (OPEN)
64	AUI	AUI	I	GND
65	JP	JP	I	Pull-Up
66	PNP	PNP	I	OPEN
67	BS0	BS0	I	OPEN
68	BS1	BS1	I	OPEN
69	BS2	BS2	I	OPEN
70	VDD	+5V		
71	BS3	BS3	I	OPEN
72	BS4	BS4	I	OPEN
73	BA15	BA15	O	N.U. (OPEN)
74	PL0	PL0	I	OPEN
75	BCSB	BCSB	O	N.U. (OPEN)
76	EECS	EECS	O	N.U. (OPEN)
77	PL1	PL1	I	OPEN
78	IRQS0	IRQS0	I	OPEN
79	IRQS1	IRQS1	I	OPEN
80	IRQS2	IRQS2	I	OPEN
81	IOS0	IOS0	I	OPEN
82	IOS1	IOS1	I	OPEN
83	GND	GND		
84	IOS2	IOS2	I	OPEN
85	IOS3	IOS3	I	OPEN
86	GND	GND		
87	SD15	SD15	I/O	N.U. (Pull-Down)
88	SD14	SD14	I/O	N.U. (Pull-Down)
89	VDD	+5V		
90	SD13	SD13	I/O	N.U. (Pull-Down)
91	SD12	SD12	I/O	N.U. (Pull-Down)
92	SD11	SD11	I/O	N.U. (Pull-Down)

No.	CPU	Signal name	I/O	Remarks
93	SD10	SD10	I/O	N.U. (Pull-Down)
94	SD9	SD9	I/O	N.U. (Pull-Down)
95	SD8	SD8	I/O	N.U. (Pull-Down)
96	SLOT16	SLOT16	I	Pull-Down
97	INT7	INT7	O	N.U. (Pull-Down)
98	INT6	INT6	O	N.U. (Pull-Down)
99	INT5	INT5	O	N.U. (Pull-Down)
100	INT4	INT4	O	N.U. (Pull-Down)

Note: Signals suffixed with the letter "B" are active in low level.

## 5. MEMORY MAP



## 6. INTERFACE WITH HOST CPU

### 1) SIGNAL LINES

The following signal lines are required for the interface with the host CPU.

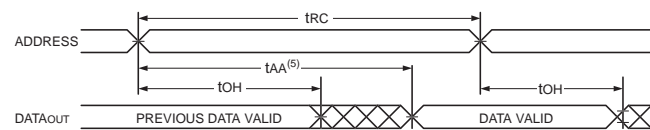
Signal name	I/O	Description	Connected to	Connection pin
A0~A11	I	Address Bus from host CPU	DP-RAM	A0R~A11R
D0~D7	I/O	Data Bus from host CPU	DP-RAM	D0R~D7R
/RD	I	Read signal from host CPU	DP-RAM	/OER
/WR	I	Write signal from host CPU	DP-RAM	R/WR
/DPCS	I	Chip select from host CPU	DP-RAM	/CER
/LRES	I	Rest signal for this board from host CPU	Board CPU	/RES
/INTSR	O	Data read end interrupt from board CPU	LOGIC	
/INTSW	O	Data write end interrupt from board CPU	LOGIC	
A13~A15	I	Address bus from host CPU (for decode)	LOGIC	
Vcc		Power(+5V)		
GND		GND		

Signals prefixed with a slash "/" are active in low level.

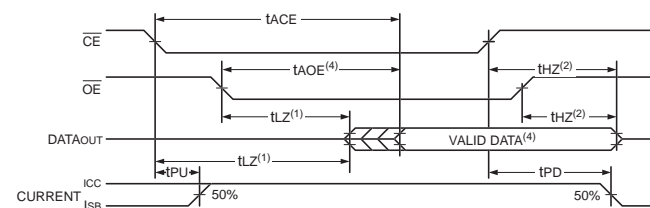
#### Cautions to be taken when designing the host side

1. It is preferable that /LRES signal to be input into the board can also be controlled by software.
2. The access timing satisfies the dual-port SRAM specification.

#### • Timing Waveform of Read Cycle No. 1, Either Side <sup>(1,2,4)</sup>



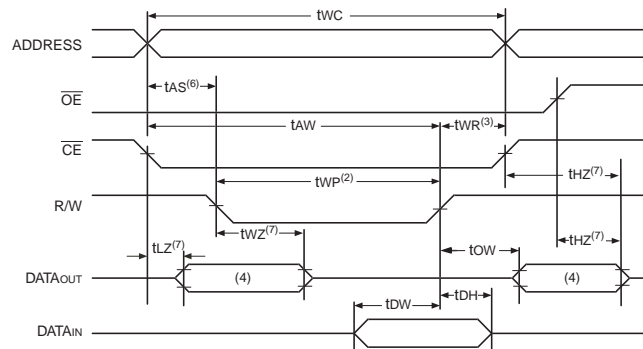
#### • Timing Waveform of Read Cycle No. 2, Either Side <sup>(1,3)</sup>



#### NOTES:

1. Timing depends on which signal is asserted last,  $\overline{OE}$  or  $\overline{CE}$ .
2. Timing depends on which signal is de-asserted first,  $\overline{OE}$  or  $\overline{CE}$ .
3.  $R/\overline{W} = VIH$ .
4. Start of valid data depends on which timing becomes effective, tAOE, tACE or tAA
5. tAA for RAM Address Access and tSAA for Semaphore Address Access.

#### • Timing Waveform of Write Cycle No. 1, $R/\overline{W}$ Controlled Timing <sup>(1,5,8)</sup>



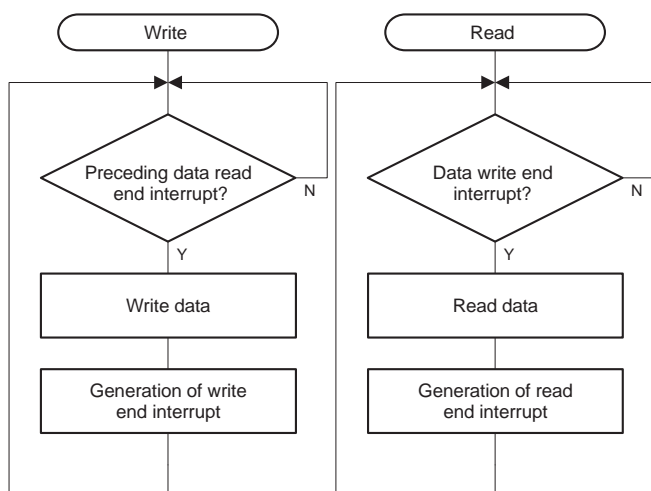
#### NOTES:

1.  $R/\overline{W}$  or  $\overline{CE}$  must be HIGH during all address transitions.
2. A write occurs during the overlap (tEW or tWP) of a  $\overline{CE} = VIL$  and  $R/\overline{W} = VIL$ .
3. tWR is measured from the earlier of  $\overline{CE}$  or  $R/\overline{W}$  going to VIH to the end-of-write cycle.
4. During this period, the I/O pins are in the output state, and input signals must not be applied.
5. If the  $\overline{CE} = VIL$  transition occurs simultaneously with or after the  $R/\overline{W} = VIL$  transition, the outputs remain in the High-impedance state.
6. Timing depends on which enable signal ( $\overline{CE}$  or  $R/\overline{W}$ ) is asserted last.
7. This parameter is guaranteed by device characterization, but is not production tested. Transition is measured  $\pm 500mV$  from steady state with the Output Test Load (Figure 2).
8. If  $\overline{OE} = VIL$  during a  $R/\overline{W}$  controlled write cycle, the write pulse width must be the larger of tWP or (tWZ + tDW) to allow the I/O drivers to turn off data to be placed on the bus for the required tDW. If  $\overline{OE} = VIH$  during an  $R/\overline{W}$  controlled write cycle, this requirement does not apply and the write pulse can be as short as the specified tWP.

## 2) DATA COMMUNICATION

Data is transmitted from the host CPU to the TCP/IP board or vice versa through the dual-port SRAM. If data is written into the same address of the dual-port SRAM from both sides or written into and read from the same address from both sides, data is not assured. The following procedure should be observed.

The format of data to be handled should meet the software specifications.



- Interrupt signals from host to board : Write/INTHW (Host Write), Read/INTHR (Host Read)

/INTHW (Host Write) is generated by writing into the address H'7\*\*\* of the dual-port SRAM and cancelled by outputting the /HWACK signal by 100ns LOW pulse.

/INTHR (Host Read) is generated by reading the address H'B\*\*\* of the dual-port SRAM and cancelled by outputting the /HRACK signal by 100ns LOW pulse.

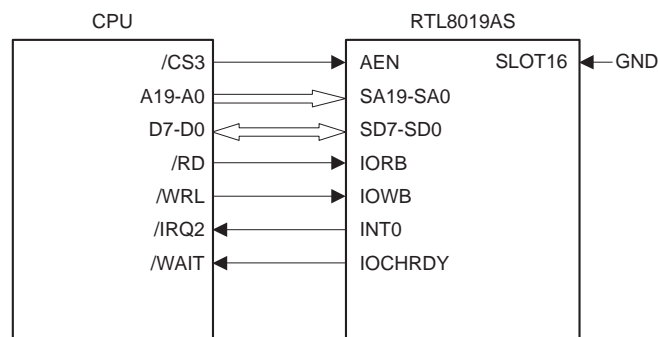
- Interrupt signals from board to host : Write /INTSW (Slave Write), Read /INTSR (Slave Read)

/INTSW (Slave Write) is generated by outputting the /SWRQ signal by 100ns LOW pulse and cancelled by writing data into the address H'B\*\*\* of the dual-port SRAM from the host side..

/INTSR (Slave Read) is generated by outputting the /SRRQ signal by 100ns low pulse and cancelled by reading data from the address H'7\*\*\* of the dual-port SRAM.

## 7. LAN CONTROL

This board fixes RTL8019AS to the 8-bit mode on hardware.



The initial values of the items in the table are set as shown below by hardware.

Item	Setting	Remarks
I/O Base Address	300H	IOS3~0=0,0,0,0
Network Media Type	TP/CX automatic detection	PL1~0=0,0
BROM Size & Memory Base Address	Disable	BS4~0=0,0,0,0,0
IRQ Select	INT0	IRQS2~0=0,0,0

Any data loading EEPROM is not used. MAC address should be written by the CPU reading data on the flash memory and writing the register of the LAN controller.

## 8. PORT SETTING

① The common pins of the CPU are set as shown below.

Pin No	I/O	Selection signal	Remarks
2	I	PE15	/WP(FLASH write STATUS)
24	I	/IRQ0	Host write end interrupt ( ↓ Edge detection)
25	I	/IRQ1	Host read end interrupt ( ↓ Edge detection)
26	I	/IRQ2	Interrupt from LANC ( ↓ Edge detection)
28	I	/IRQ3	Reserve ( ↓ Edge detection)
29	O	A18	Address Bus
30	O	A19	Address Bus
31	I	/WAIT	wait from LANC
44	O	/CS3	Chip Select for LAN (Usual access space)
45	O	/CS2	Chip Select for dual-port SRAM
106	O	PE8	/SRRQ (Board side read end request)
107	O	PE9	/SWRQ (Board side write end request)
108	O	PE10	/HRACK (host side read end interrupt cancel)
110	O	PE11	/HWACK (host side write end interrupt cancel)
112	O	PE13	/RSTDRViActive Lowj

## 9. CONNECTOR PIN TABLE

### 1) HOST I/F CONNECTOR

Pin No.	Signal name	Pin No.	Signal name
1	+5V	2	+5V
3	+5V	4	+5V
5	A15	6	A14
7	A13	8	A12
9	/DPCS	10	/WR
11	A11	12	A10
13	/RD	14	A0
15	A1	16	A2
17	A3	18	A4
19	A5	20	A6
21	A7	22	A8
23	A9	24	D7
25	D6	26	D5
27	D4	28	D3
29	D2	30	D1
31	D0	32	/LRES
33	/INTSR	34	/INTSW
35	NC	36	NC
37	GND	38	GND
39	GND	40	GND

### 2) RELAY CABLE

Pin No.	Signal name
1	TX+
2	TX-
3	RX+
4	RX-
5	GND

### 3) RJ-45 CONNECTOR

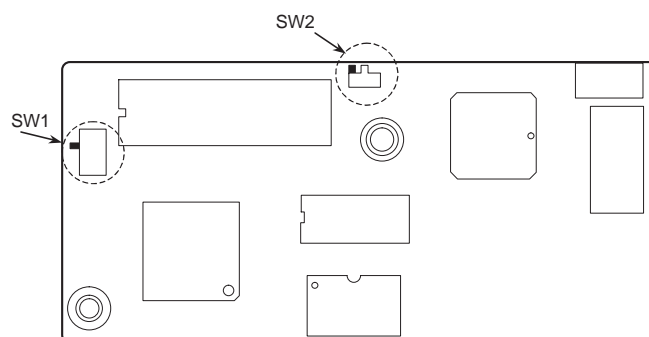
Pin No.	Signal name
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

## 10. SWITCH SETTING

The board has two switches on it: program loading EPROM(Master ROM) selection switch (SW1) and flash memory write protect switch (SW2).

### 1) LOCATION OF SWITCHES

The two switches are located on the board as shown below.



### 2) SWITCH SETTING AT SHIPPING

The factory setting of the switches are as follows:

Switch	Setting	Details of setting
SW1	4pin side	Boot from FLASH MEMORY
SW2	GND side	Write protect into FLASH MEMORY

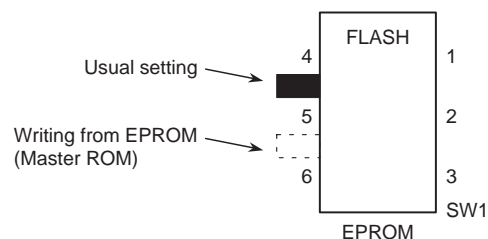
### 3) FUNCTIONS OF THE SWITCHES

#### 3)-1. Program loading EPROM (Master ROM) selection switch: SW1

SW1 selects booting from EPROM (Master ROM) to write program data into flash memory.

When writing data from EPROM (Master ROM) to flash memory, switch over to 6-pin side.

Usually, SW1 is set to marking side.

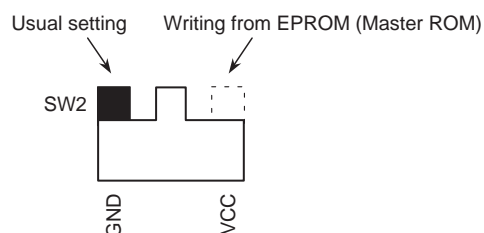


#### 3)-2. Flash memory write protect switch: SW2

SW2 inhibits writing into flash memory.

When writing data from the EPROM (Master ROM) to the flash memory.

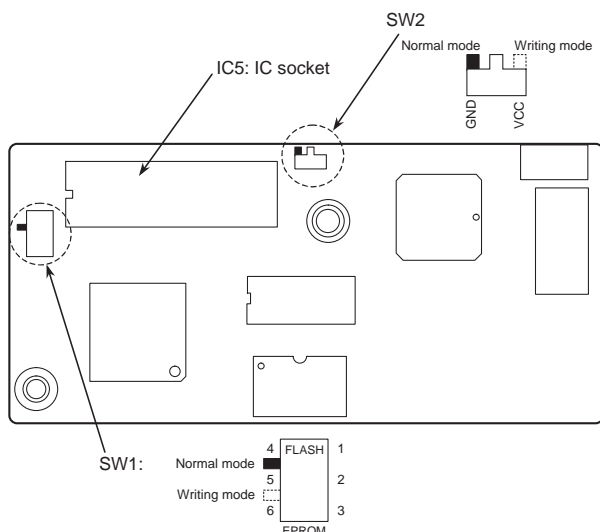
Usually, the switch is set to the marking side.



## 11. WRITING / READING THE MAC ADDRESS / FIRMWARE PROGRAM

### 1) WRITING THE MAC ADDRESS & FIRMWARE PROGRAM

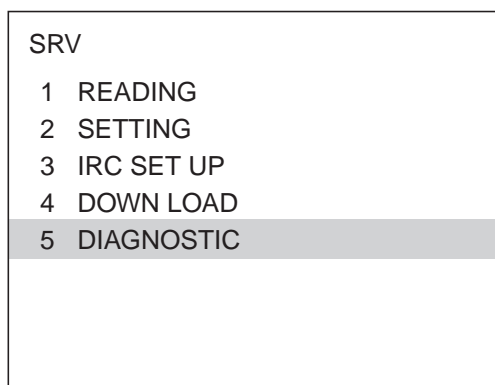
- 1) Install the EPROM (Master ROM) to the TCP/IP I/F PWB (IC5:IC socket).
- 2) Set the following switches to the (Writing mode) on the TCP/IP I/F PWB.



SW1 : [FLASH] → [EPROM]

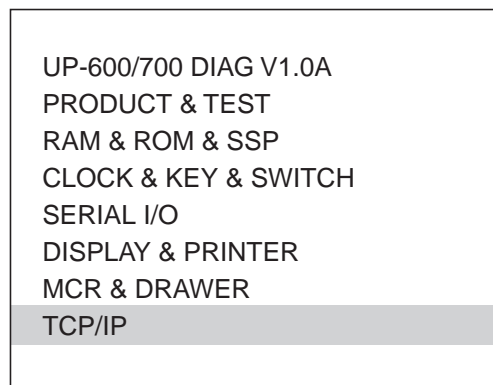
SW2 : [GND] → [VCC]

- 3) Set the mode switch of the UP-700 to SRV position.
- 4) Turn ON the AC switch of the UP-700.
- 5) Display : [SRV MODE]



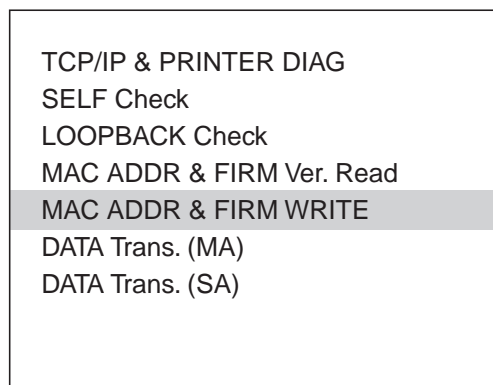
Select the [5. DIAGNOSTIC] and press the ENTER key

Display : [5. DIAGNOSTIC]



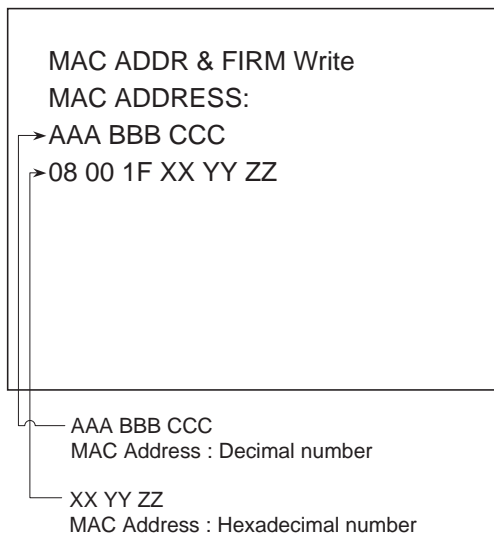
Select the [TCP/IP] and press the ENTER key

Display : [TCP/IP]



Select the [MAC ADD&FIRM WRITE] and press the ENTER key

Display : [MAC ADDR&FIRM WRITE]



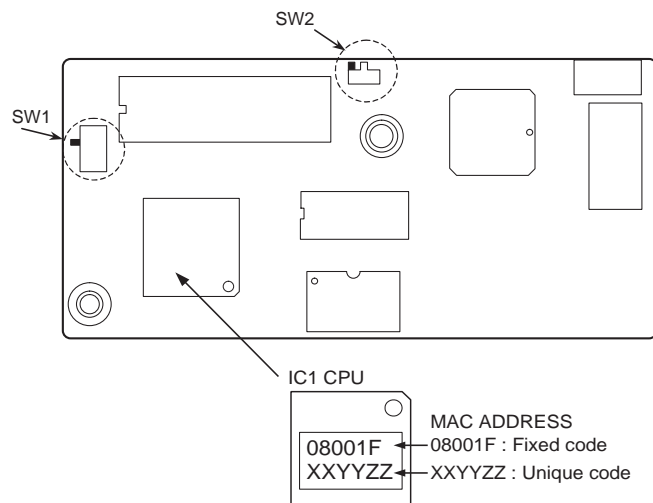
Input the MAC address and press the ENTER key.

- MAC address:

The TCP/IP I/F PWB has a seal carrying a MAC address of hexadecimal number attached on its CPU.

Enter this unique code (XXYYZZ) of hexadecimal number as the values (3 values of 3 digits) converted to decimal numbers, through the keyboard.

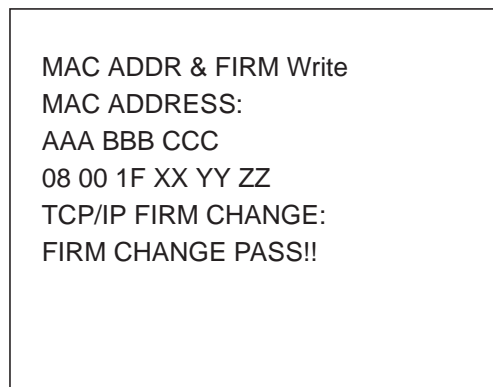
Example: When XX,YY,ZZ = 10,00,EB, enter 016,000,224 as decimal numbers.



Start the writing of the MAC address & Firmware program

When writing is completed, the following message is displayed as shown below.

Display :



- 6) Press the CANCEL key to exit.
- 7) Turn OFF the AC switch of the UP-700.
- 8) Remove the EPROM (Master ROM) from the TCP/IP I/F PWB (IC5: IC socket).
- 9) Set the following switches to the (Normal mode) on the TCP/IP I/F PWB.  
SW1 : [EPROM] → [FLASH]  
SW2 : [VCC] → [GND]
- 10) Execute the "Service reset" .

## 2) READING THE MAC ADDRESS & FIRMWARE PROGRAM

- 1) Set the mode switch of the UP-700 to SRV position.
- 2) Display : [SRV MODE]

SRV

- 1 READING
- 2 SETTING
- 3 IRC SET UP
- 4 DOWN LOAD
- 5 DIAGNOSTIC

Select the [ 5. DIAGNOSTIC ] and press the ENTER key

Display : [ 5. DIAGNOSTIC ]

UP-600/700 DIAG V1.0A

- PRODUCT & TEST
- RAM & ROM & SSP
- CLOCK & KEY & SWITCH
- SERIAL I/O
- DISPLAY & PRINTER
- MCR & DRAWER
- TCP/IP

Select the [ TCP/IP ] and press the ENTER key

Display : [TCP/IP]

TCP/IP & PRINTER DIAG

- SELF Check
- LOOPBACK Check
- MAC ADDR & FIRM Ver. Read
- MAC ADDR & FIRM WRITE
- DATA Trans. (MA)
- DATA Trans. (SA)

Select the [MAC ADDR&FIRM Ver. Read] and press the ENTER key

Display : [MAC ADDR&FIRM Ver. Read]

MAC ADDR & FIRM Ver. READ

MAC ADDRESS:

→ 08 00 1F XX YY ZZ

FIRMWARE VERSION:

→ 27040 \*\*\*\*\*

XX YY ZZ  
MAC Address : Hexadecimal number

\*\*\*\*\* : Version number

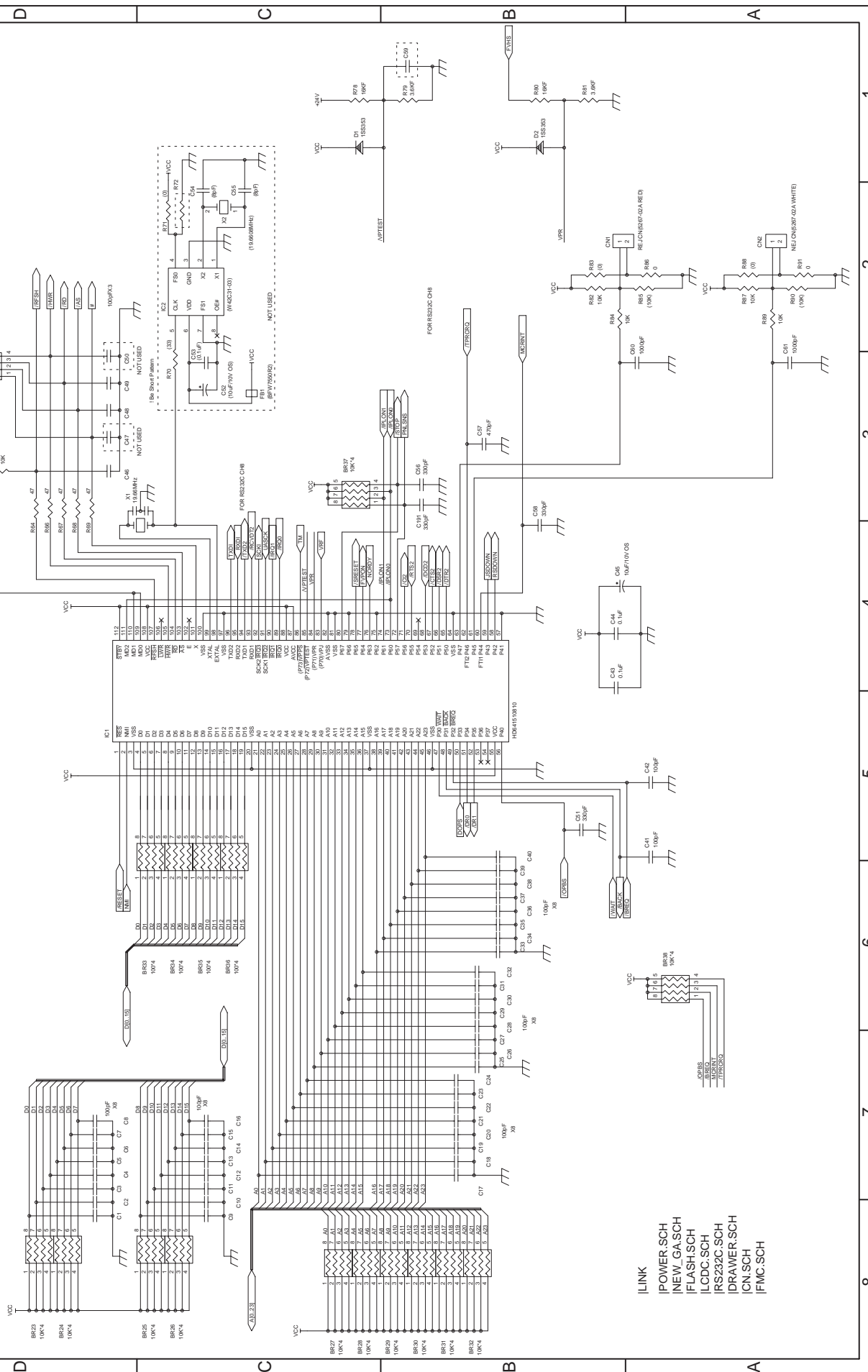
- 3) Press the CANCEL key to exit .

# CHAPTER 8. CIRCUIT DIAGRAM

## 1. MAIN PWB CIRCUIT DIAGRAM

### 1) CPU

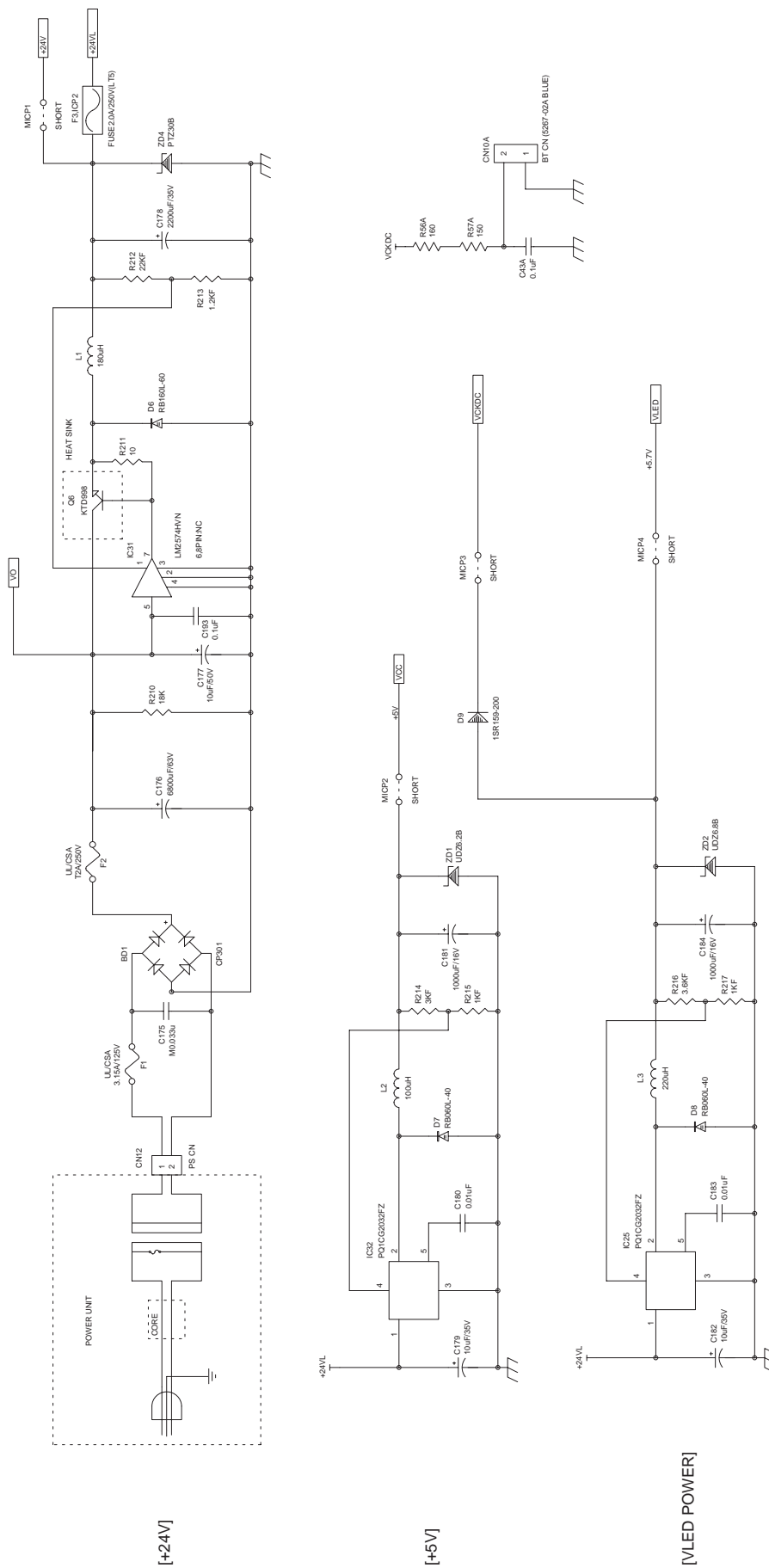
1/8





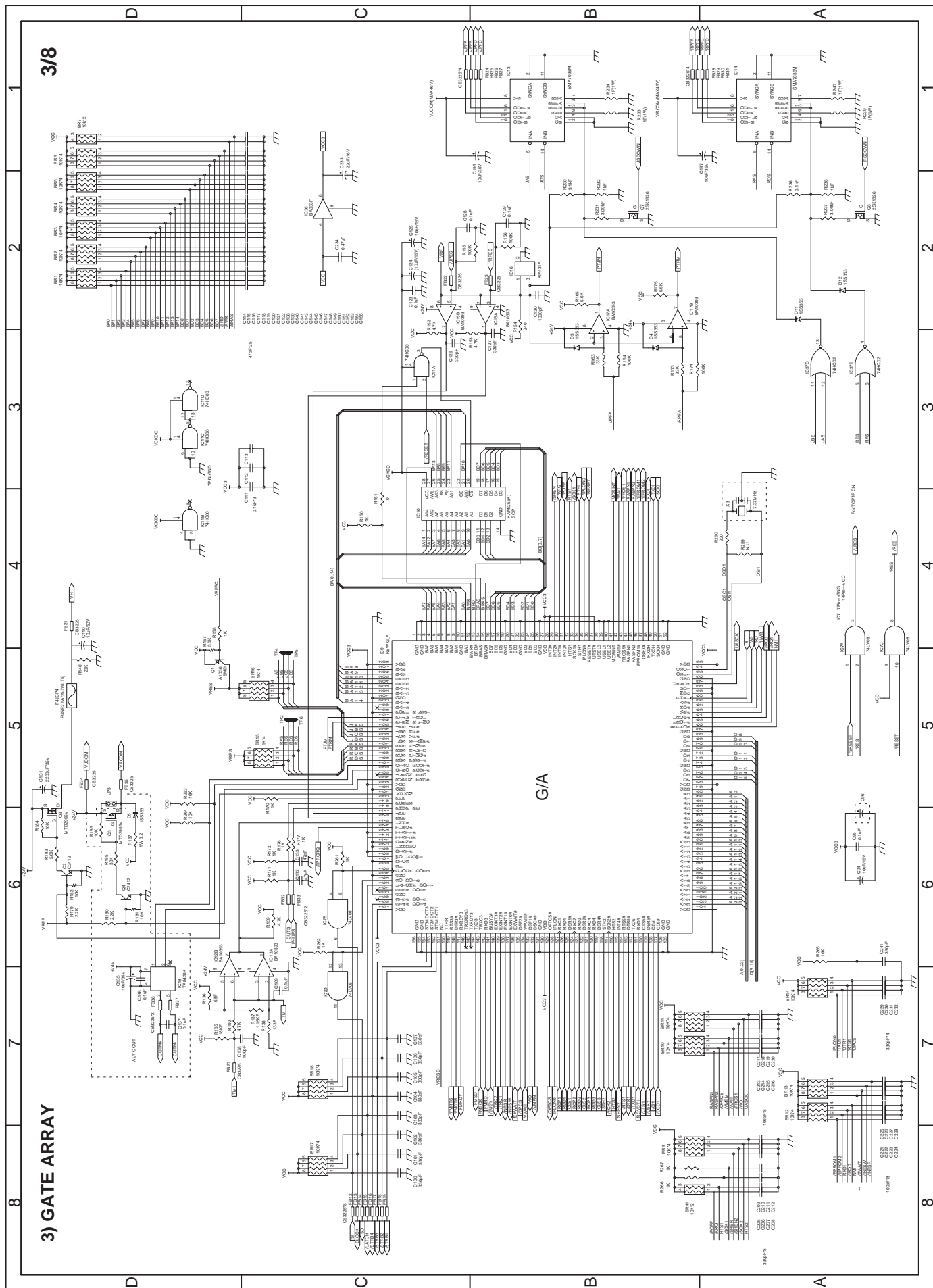
2/8

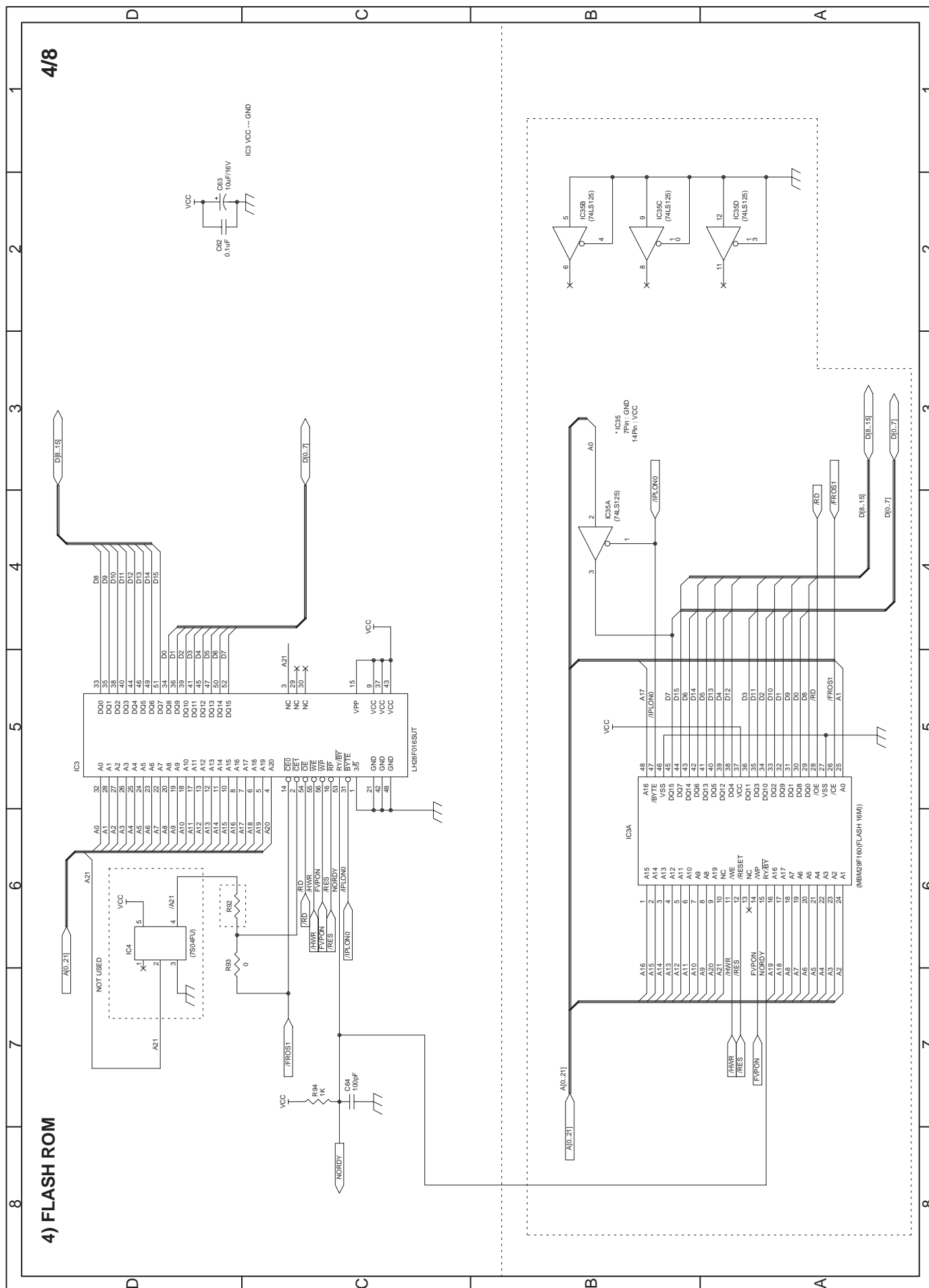
## 2) POWER



3/8

## 3) GATE ARRAY

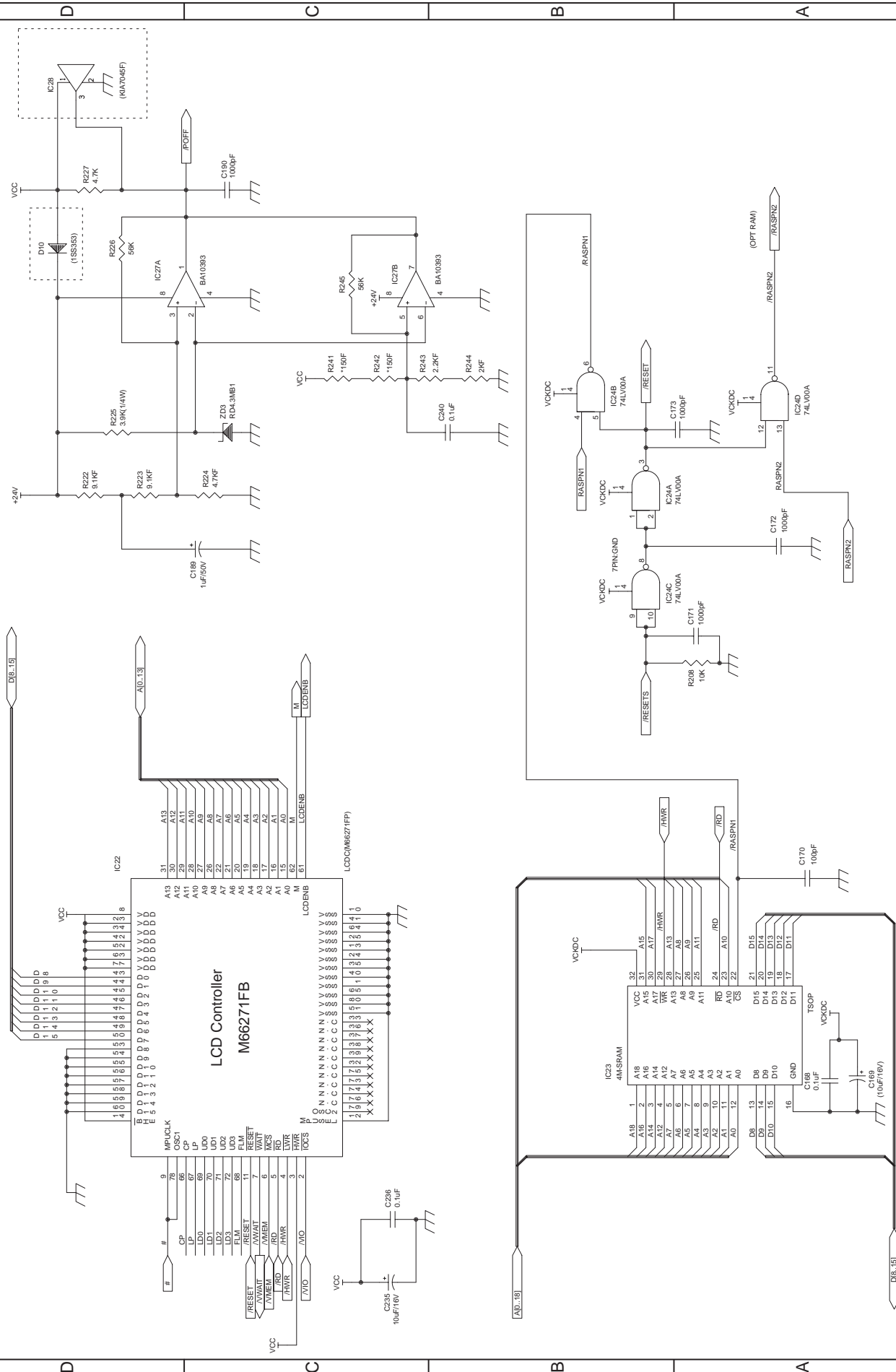


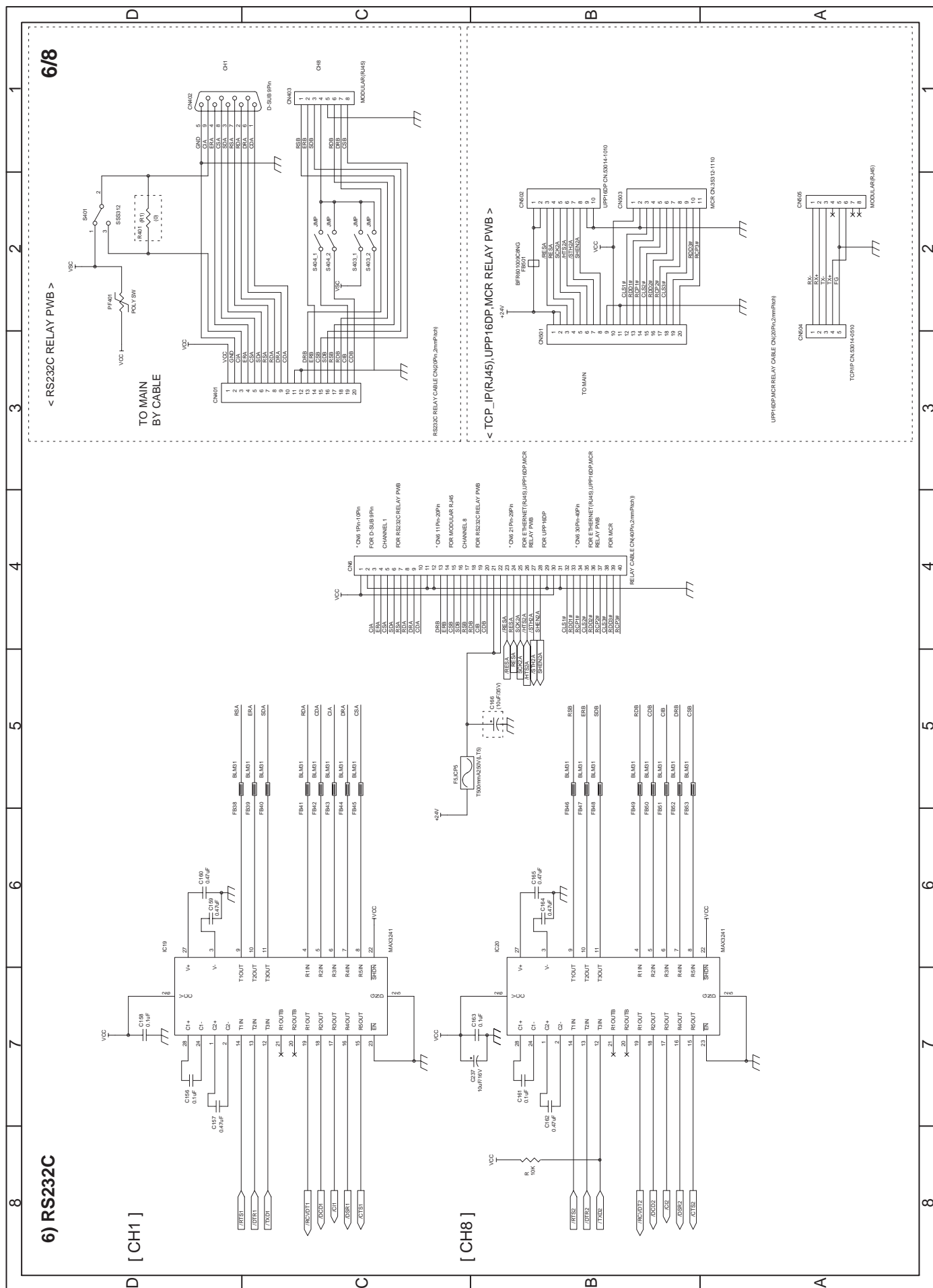


## 5) LCDC\_MEMORY

[POFF]

5/8



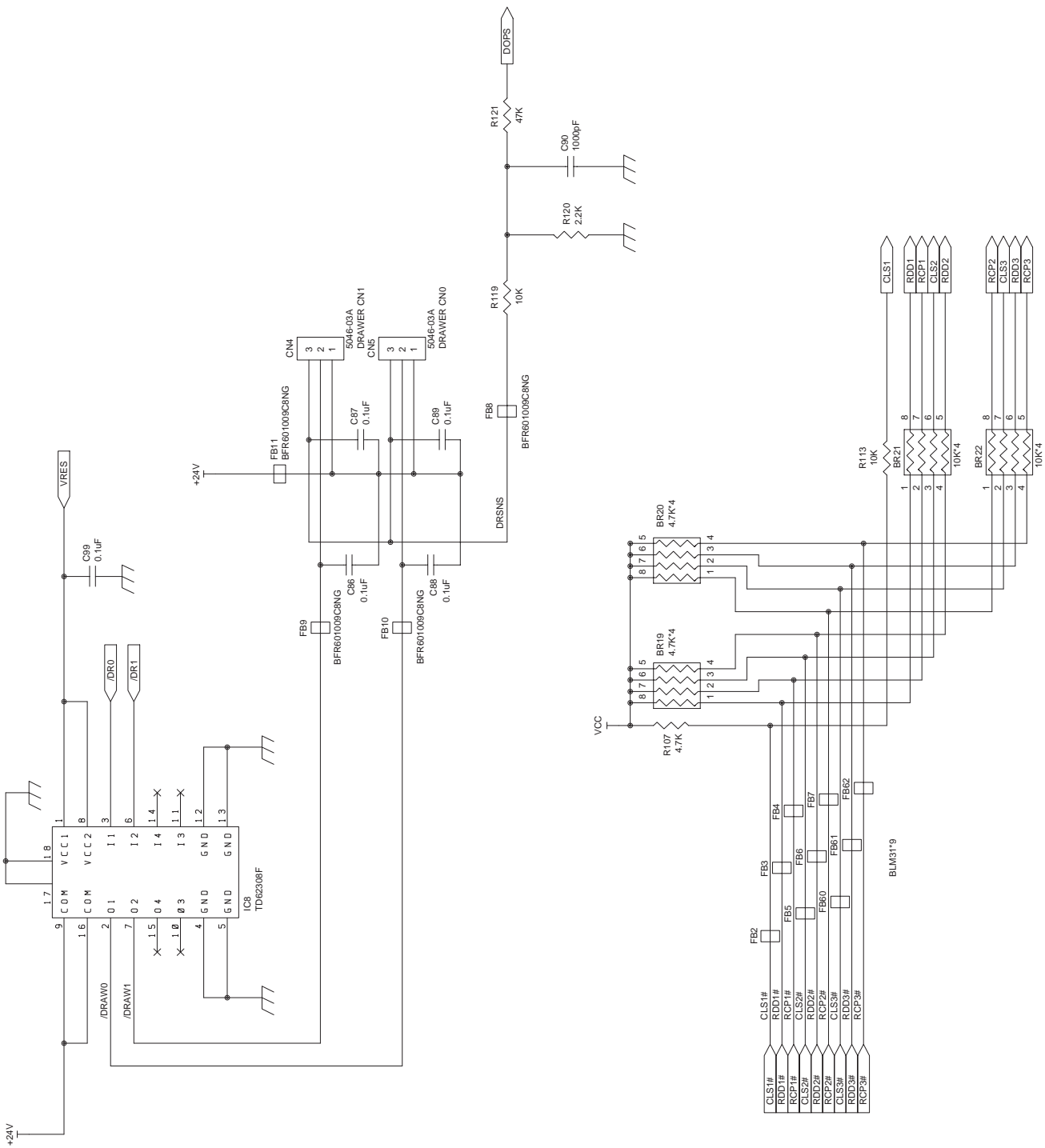


7/8

## 7) DRAWER\_MCR

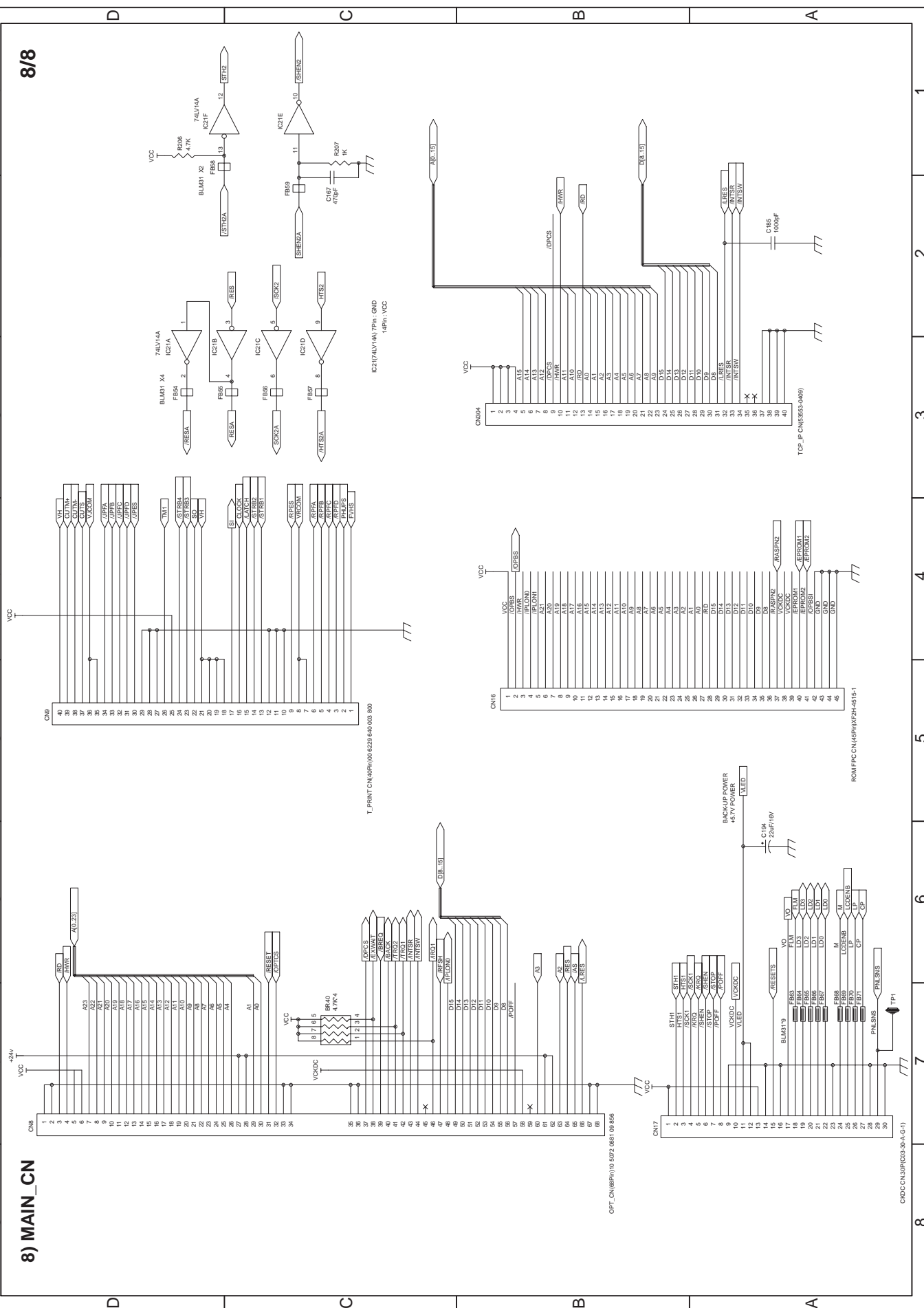
&lt;DRAWER&gt;

&lt;MCR&gt;



## 8) MAIN\_CN

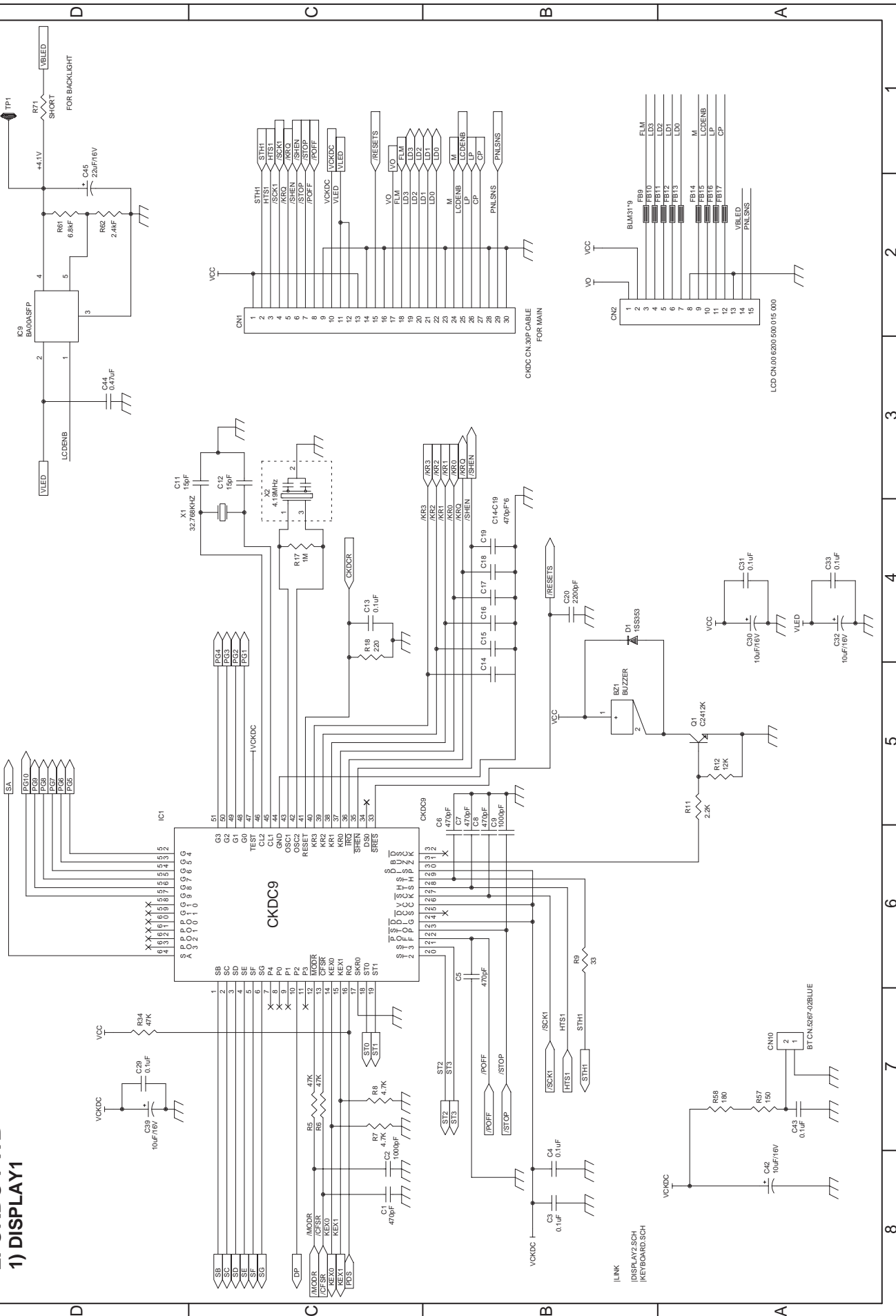
8/8



## 2. CKDC PWB

### 1) DISPLAY1

1/3

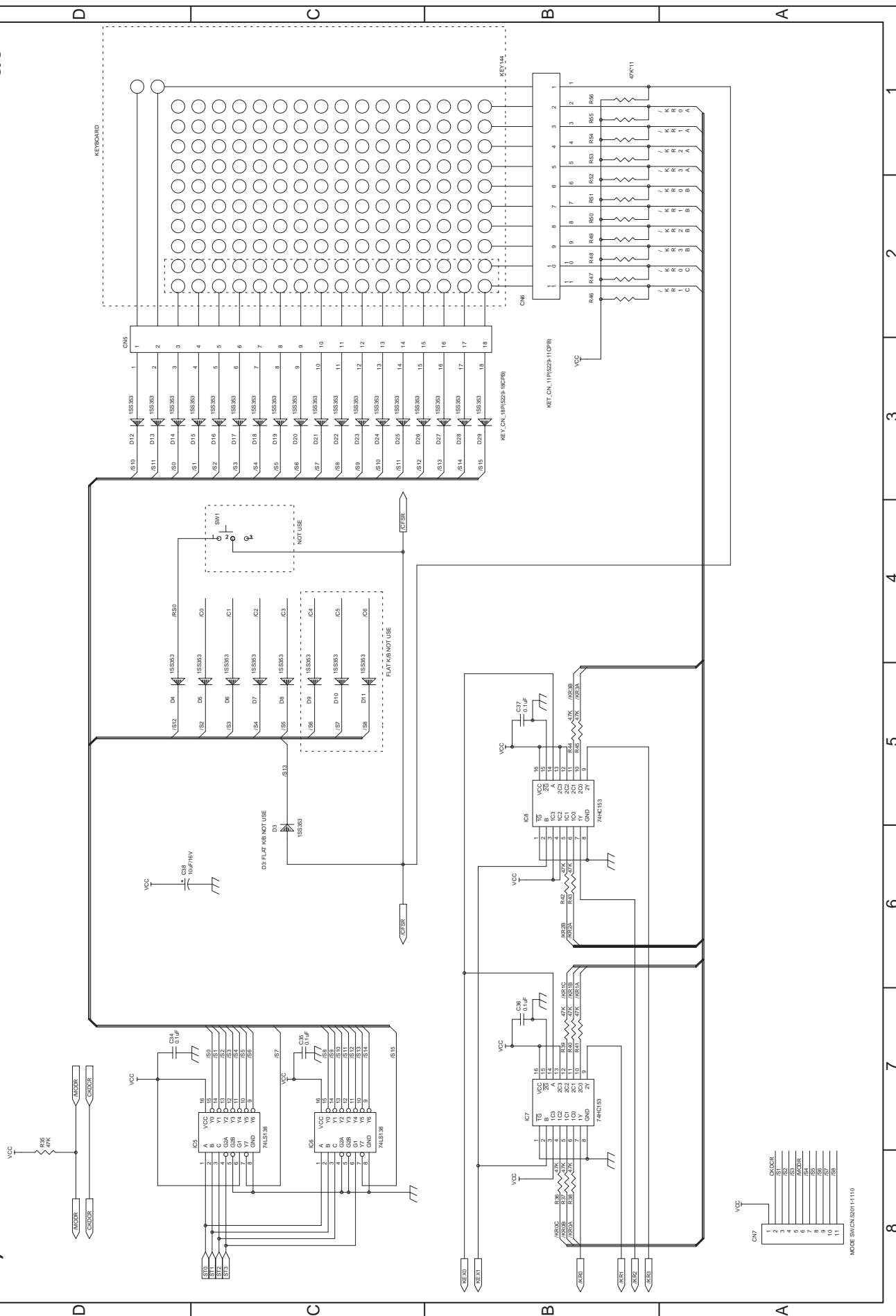






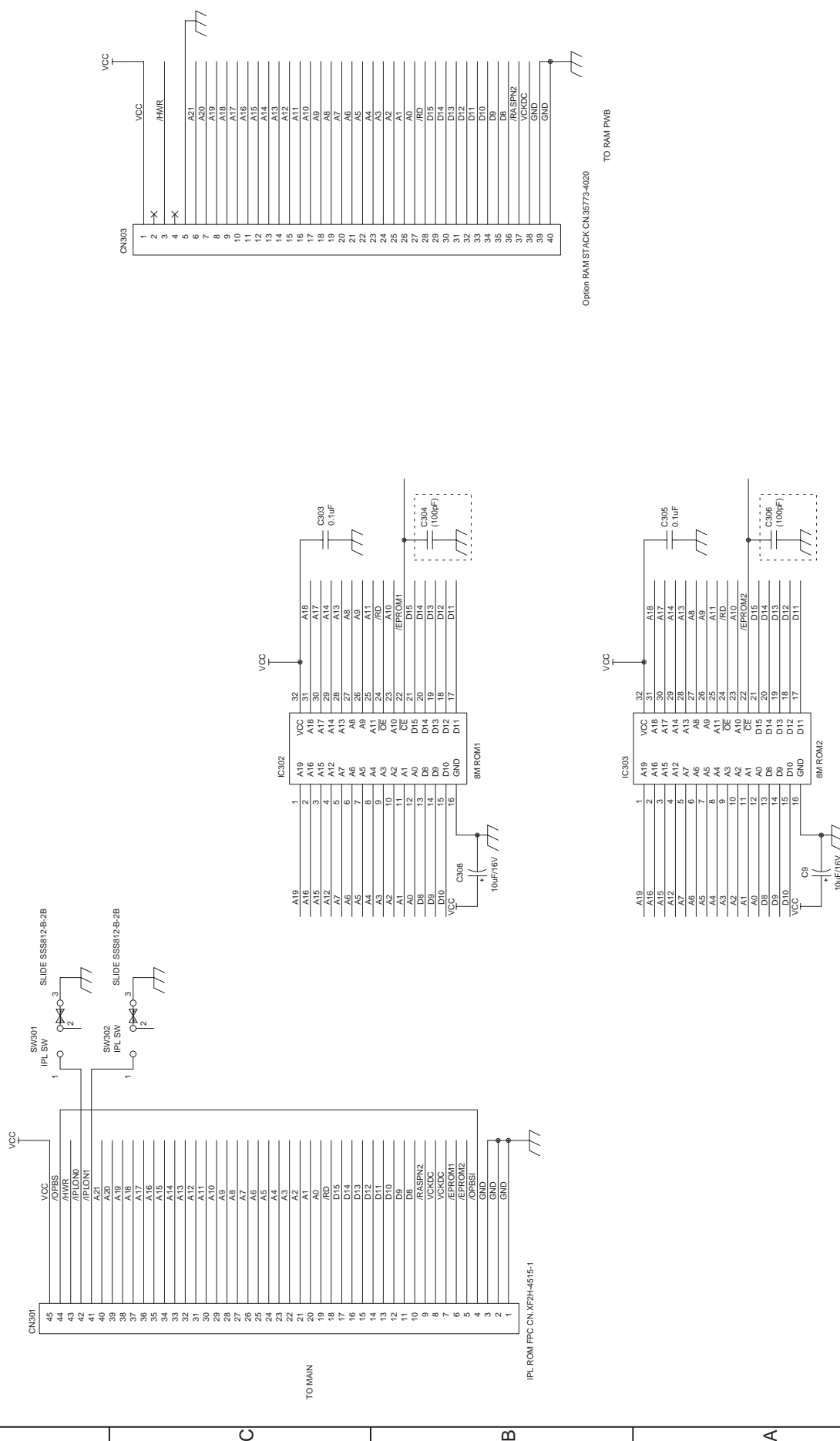
## 3) KEYBOARD

3/3



### 3. IPL ROM PWB

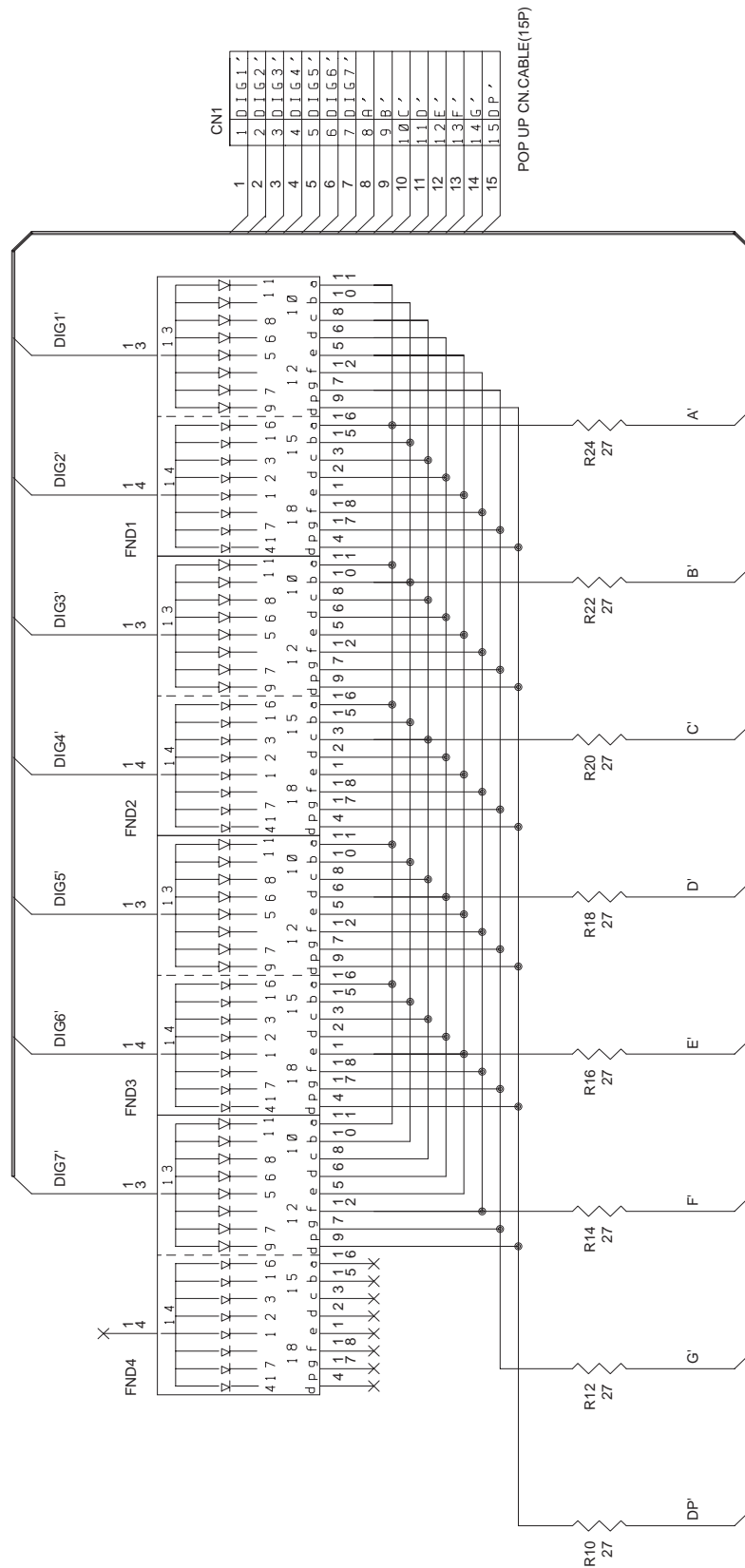
IPL-ROM RELAY PWB]

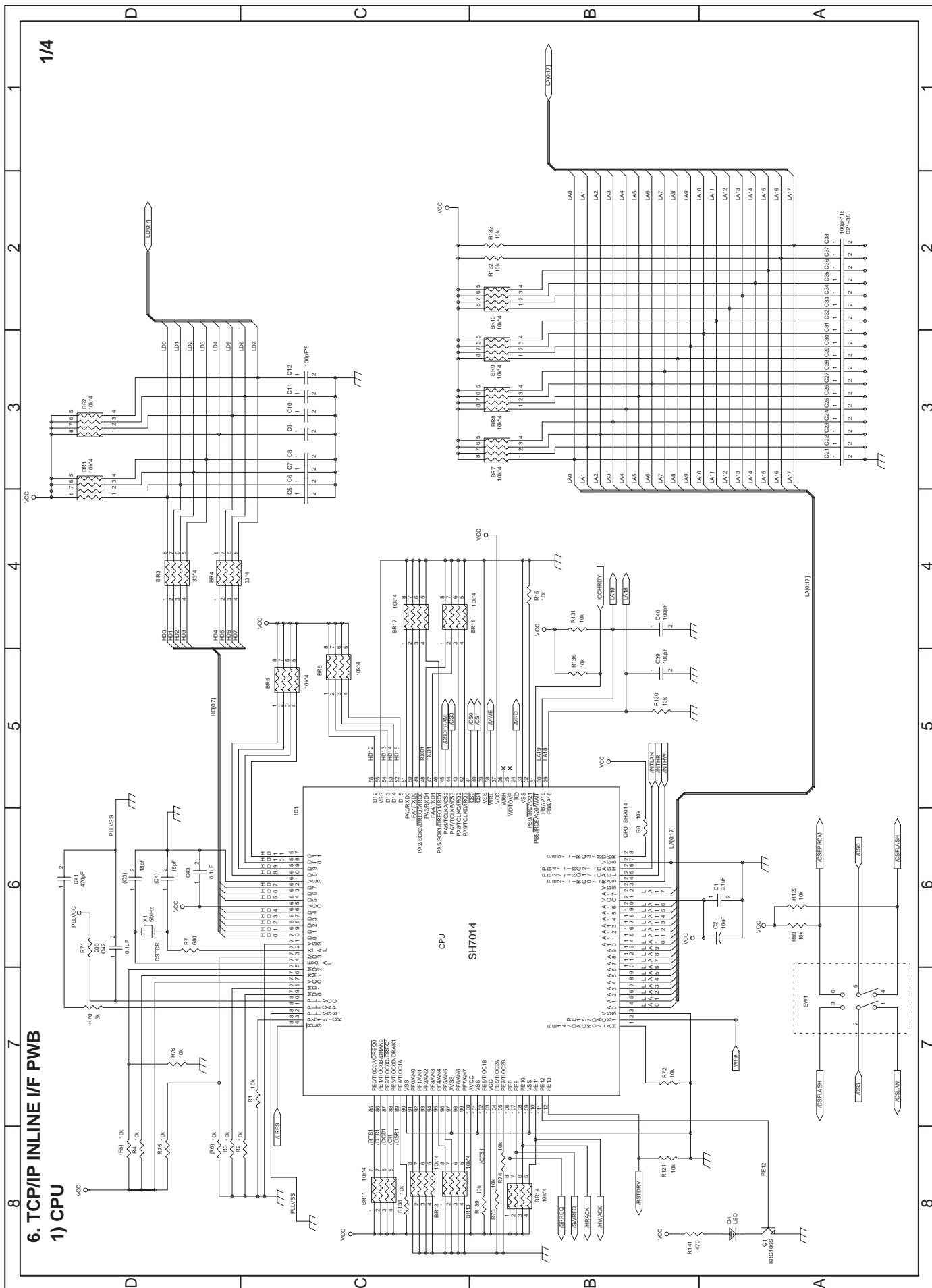


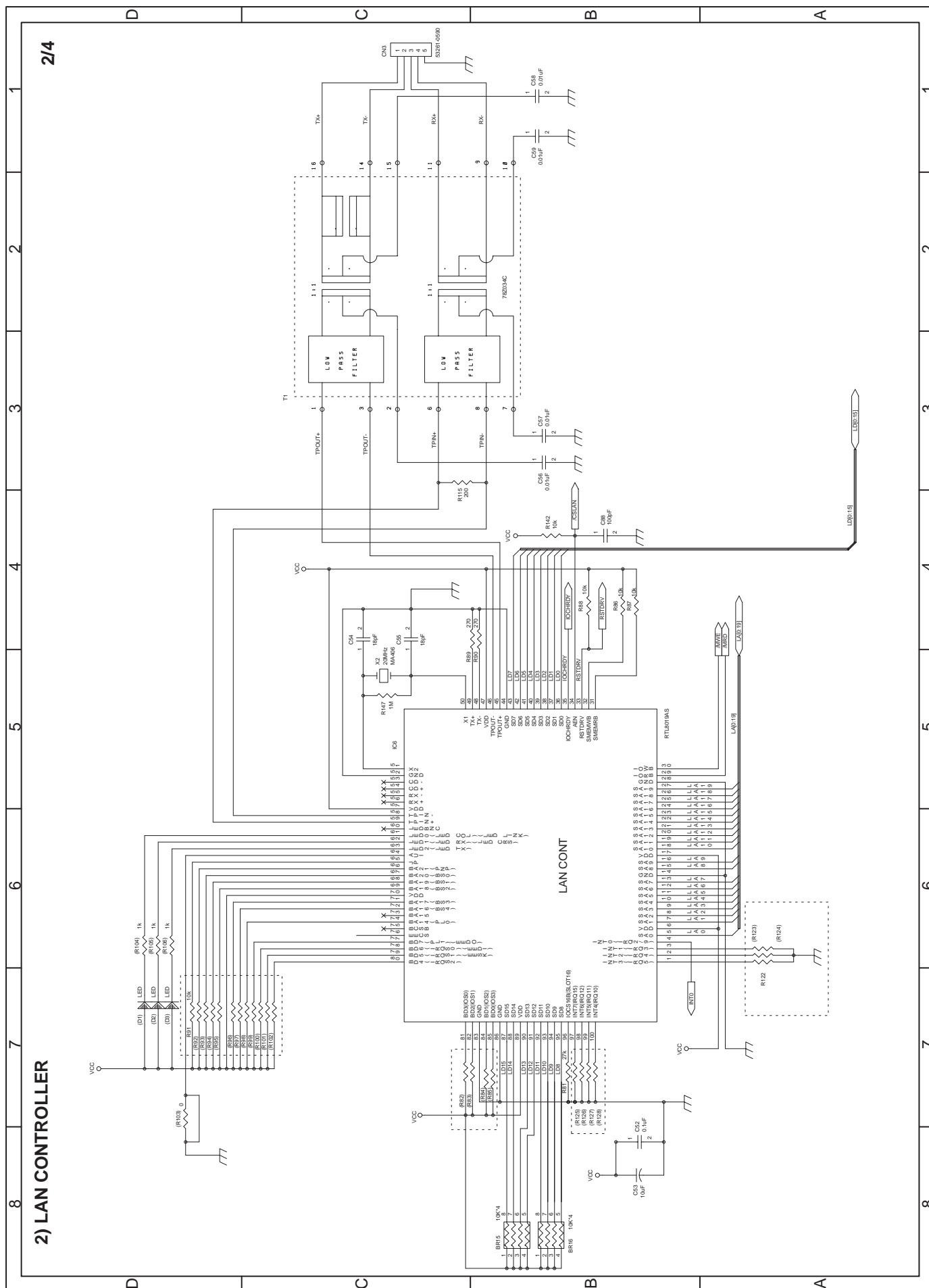


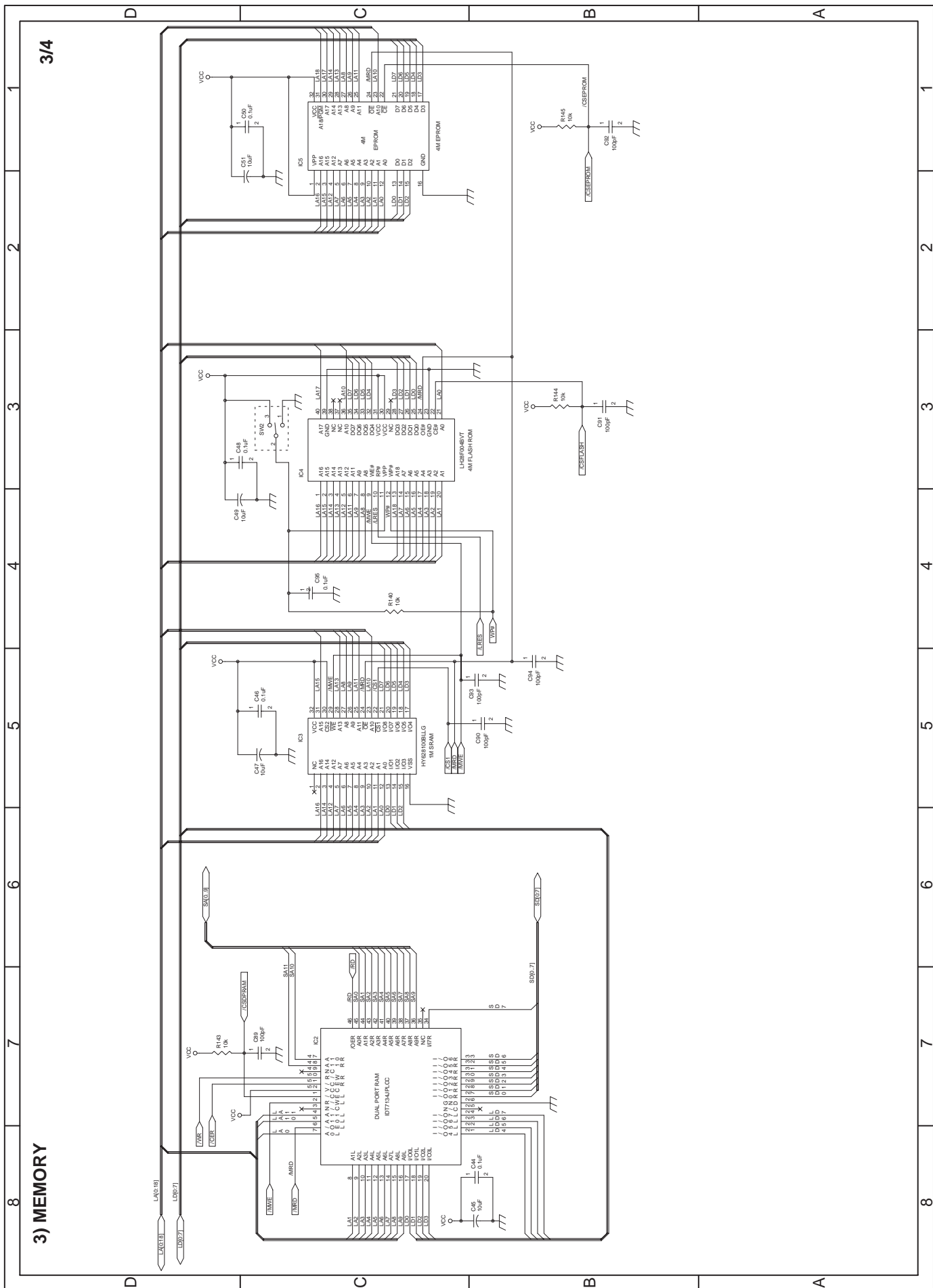
## 5. POP UP DISPLAY PWB

1/1









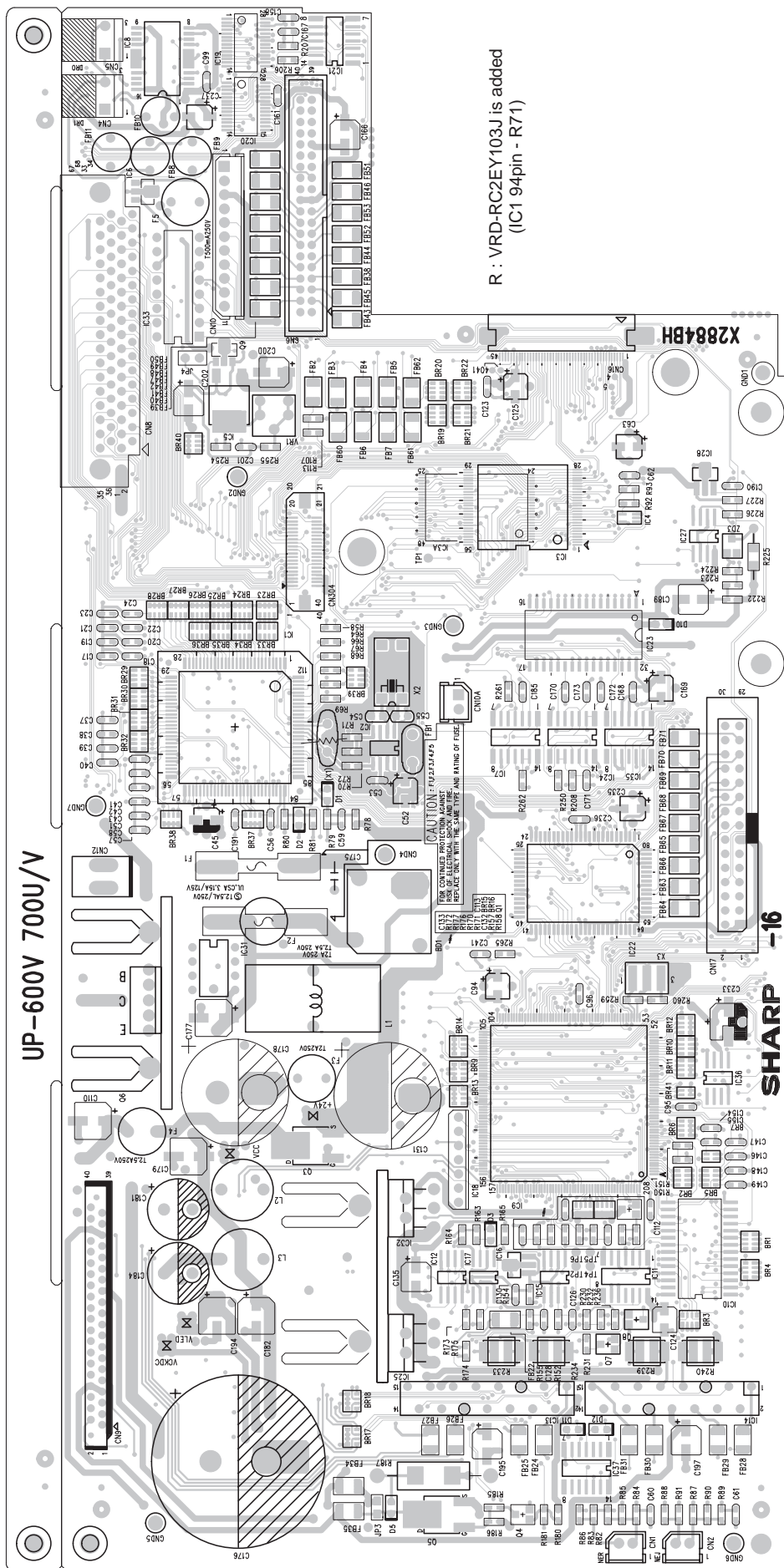


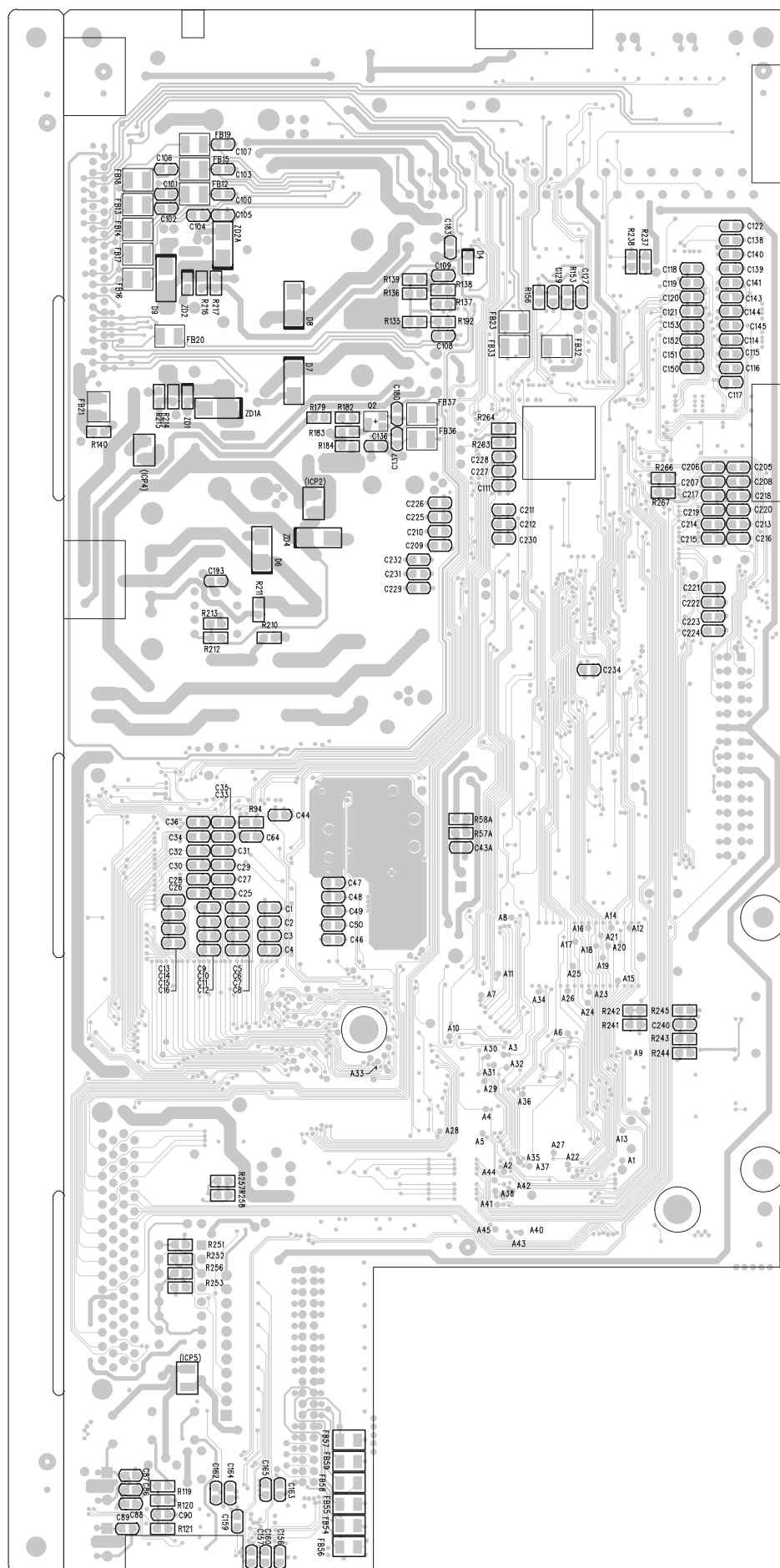


## CHAPTER 9. PWB LAYOUT

## 1. MAIN PWB

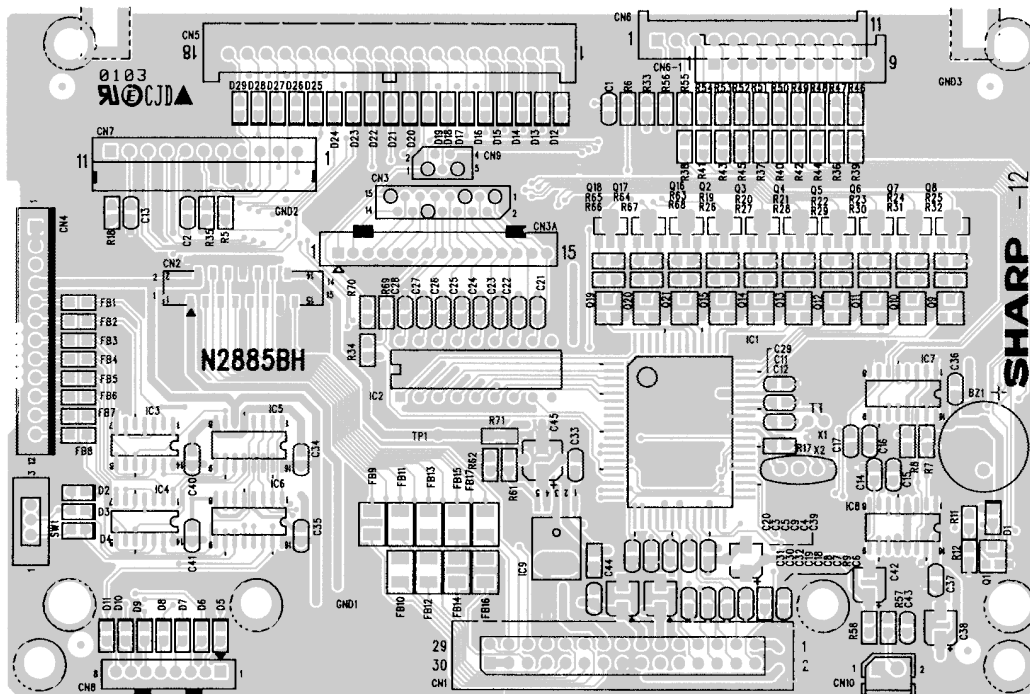
## 1) A side





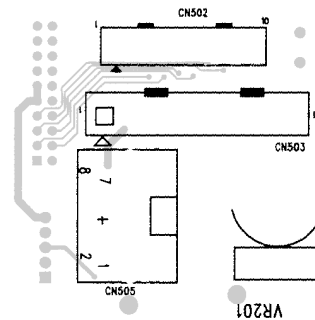
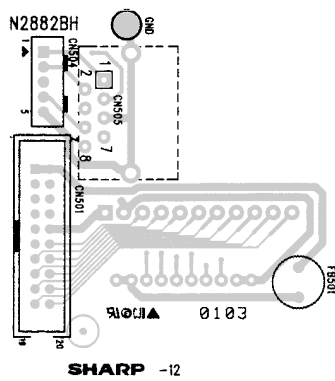
## 2) B side

## 2. CKDC PWB



## 3. DISPLY &amp; MCR PWB 1) A side

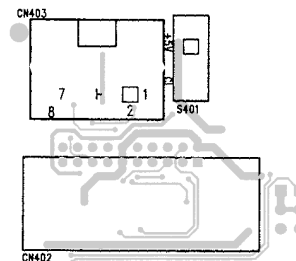
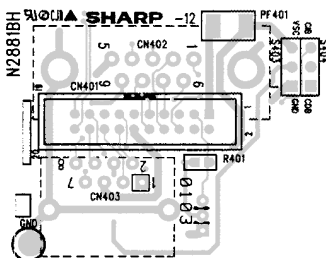
## 2) B side



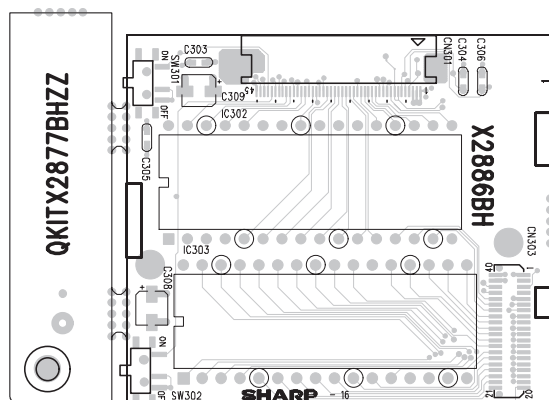
## 4. RS232 RELAY PWB 1) A side

## 2) B side

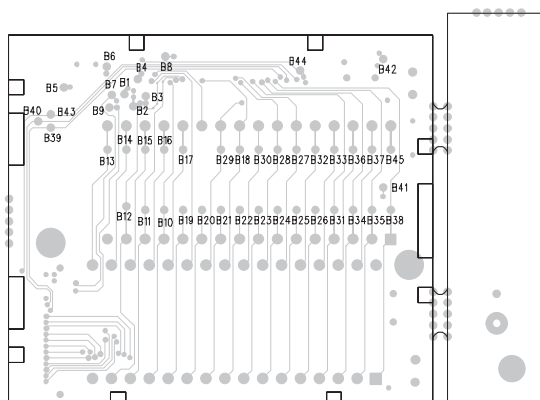
QKITN2878BHZZ



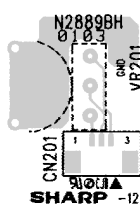
## 5. IPL ROM PWB 1) A side



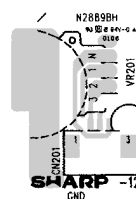
## 2) B side



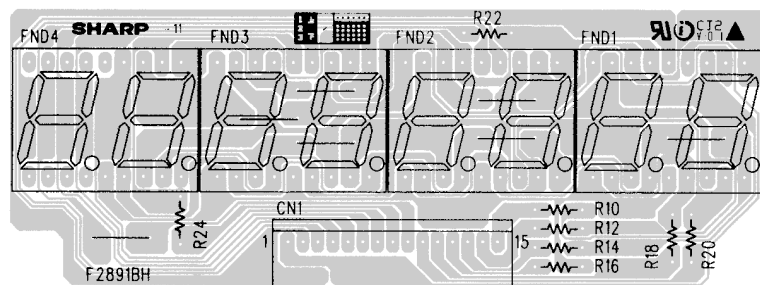
## 6. TCP/IP RELAY PWB



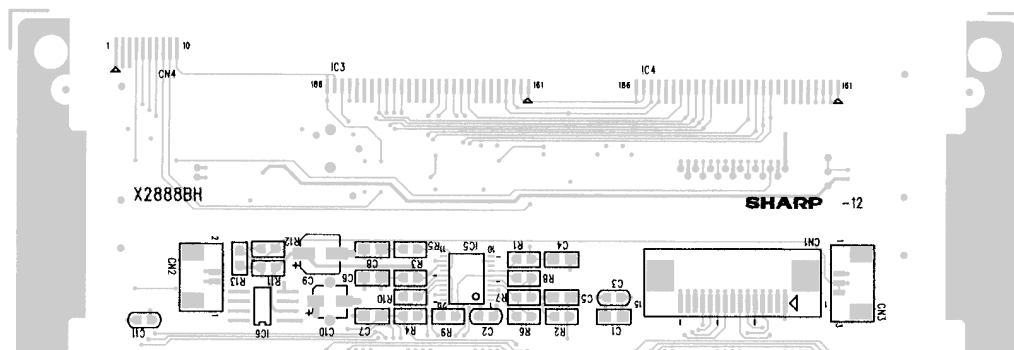
## 7. VR PWB



## 8. POP UP DISPLY

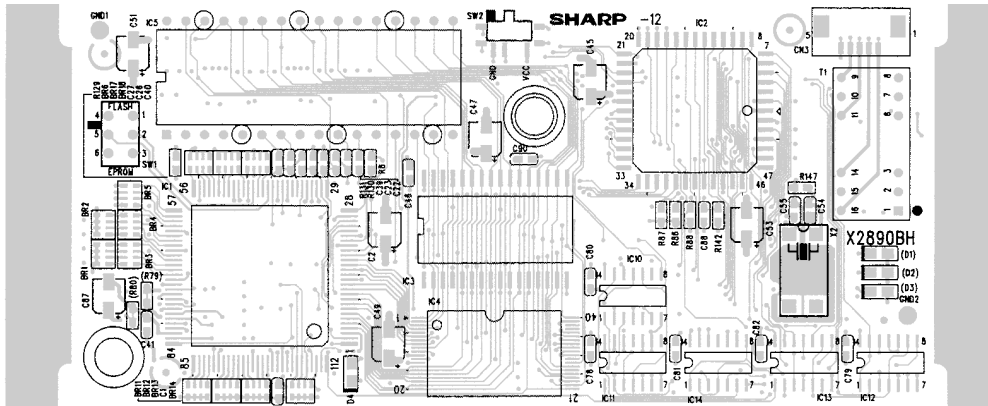


## 9. LCD I/F PWB

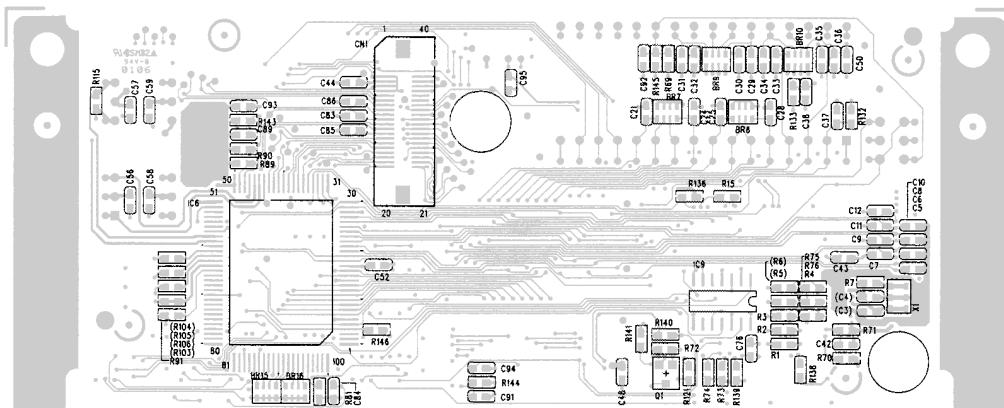


## 10. TCP/IP I/F PWB

A side



B side



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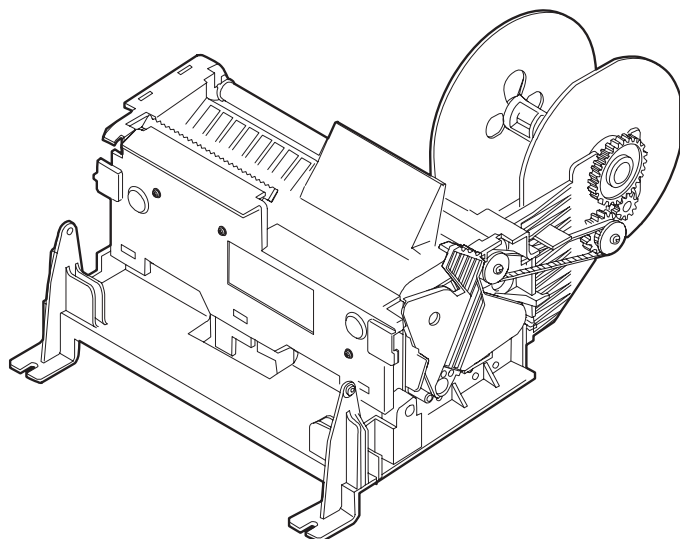
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2001 July Printed in Japan ⓘ

# SHARP SERVICE MANUAL

CODE: 00ZPR58HMSM/E



## THERMAL PRINTER

### MODEL PR-58HM

#### CONTENTS

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CHAPTER 7. PWB LAYOUT .....	21
PARTS GUIDE (Printer assembly: Ki-OB2009BHZZ)	

**APPLICATION MODEL : UP-700 ("U" & "A" version)**

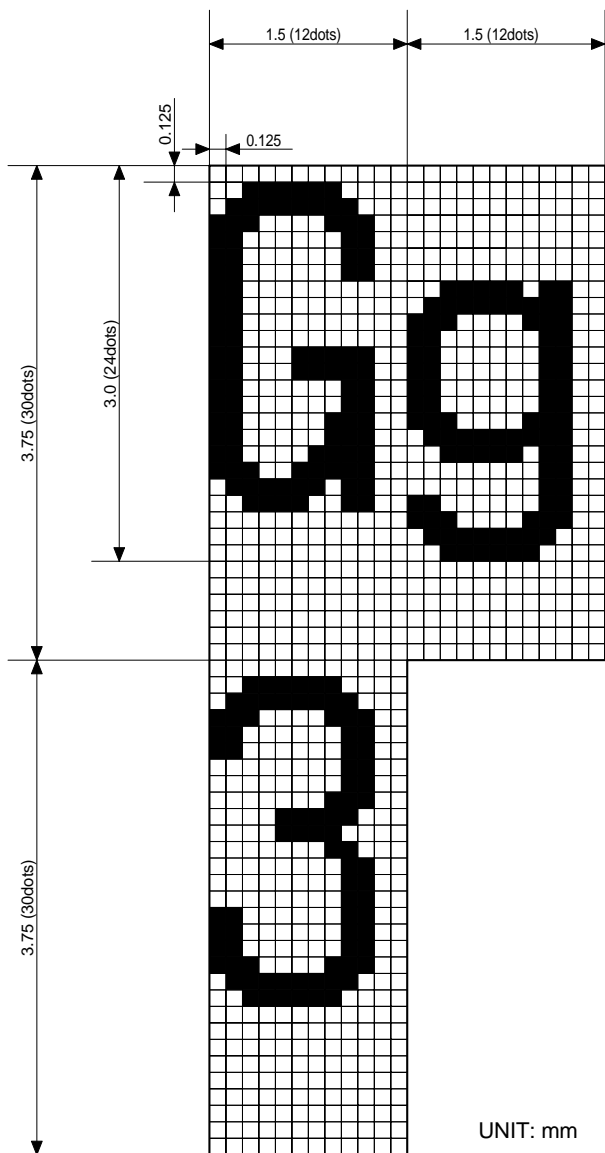


# CHAPTER 1. SPECIFICATIONS

## 1. Specifications

### 1) Printer

Item	Description
No. of stations	2: Receipt and Journal
Validation	No
Printing system	Line thermal
No. of dots	Receipt: 360 dots Journal: 360 dots
Dot pitch	Horizontal: 0.125 mm Vertical: 0.125 mm
Font	10 dots (W) × 24 dots (H)
Printing capacity	Receipt: Max. 30 characters Journal: Max. 30 characters
Character size	1.25 mm (W) × 3.0 mm (H): At 10 × 24 dots
Print pitch	Column distance: 1.5 mm Row distance: 3.75 mm
Paper feed speed	Approximately 65 mm/s
Reliability	Mechanism: MCBF 5 million lines
Paper end sensor	Yes (Receipt and Journal)
Cutter	Manual
Paper near end sensor	No
Printing area	<p>Diagram illustrating the printing area dimensions in mm:</p> <ul style="list-style-type: none"> <li>Total width: 106(848dots)</li> <li>Left section width: 360dots (45)</li> <li>Dot pitch: 0.125 mm</li> <li>Right section width: 57.5 ± 0.5 mm</li> <li>Margins: (7.0) mm (left), (5.5) mm (right), (5.5) mm (bottom left), (7.0) mm (bottom right)</li> <li>Gap between sections: 5.0 mm</li> <li>UNIT: mm</li> </ul>

Item	Description
Printing format	<p>12 × 24 font</p>  <p>UNIT: mm</p>

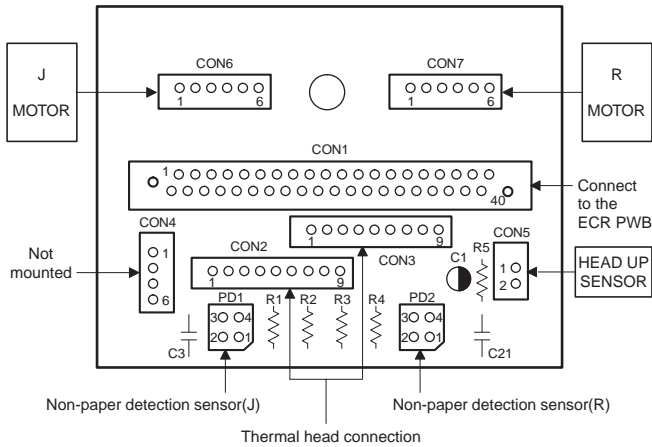
## 2) Tools required for maintenance and repair

For	NAME	Remarks
Maintenance	Cleaning brush	
	Cotton swab	
	Clean cloth	
	Alcoholic solvent	Ethanol, Methanol, IPA
	Cleaning brush	
Repair	(+) Screwdriver	
	(-) Screwdriver	
	Tweezers	
	Pliers	
	Nippers	
	Soldering iron	
	ET holder	
	Grease : G-36	00BB703600001
	Cleaning brush	
	Cotton swab	
	Clean cloth	
	Alcoholic solvent	Ethanol, Methanol, IPA
	Cleaning brush	

## CHAPTER 2. OUTLINE OF DRIVING CIRCUIT

### 1. Block diagram & Connection diagram

#### 1) Block diagram



#### 2) Connector table

Connection to the ECR PWB

CON1: <For ECR PWB>

PinNo.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	VHIN	2	—	3	—	4	—
5	VJCOM	6	VJCOM	7	/JPFA	8	/JPFB
9	/JPFC	10	/JPFD	11	/JPES	12	GND
13	GND	14	GND	15	TM	16	VDD (+5V)
17	/STB4	18	/STB3	19	Din	20	VH
21	VH	22	VH	23	VH	24	Dout
25	CLK	26	/LAT	27	/STB2	28	/STB1
29	GND	30	GND	31	GND	32	/RPES
33	VRCOM	34	VRCOM	35	/RPFA	36	/RPFB
37	/RPFC	38	/RPFD	39	PHUPS	40	VHOUT

CON2: <For Thermal head connector A>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	VH	2	VH	3	Dout
4	CLK	5	/LAT	6	/STB3
7	/STB1	8	GND	9	GND

CON3: <For Thermal head connector B>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	2	GND	3	NC
4	TM	5	VDD (+5V)	6	/STB4
7	/DTB3	8	Din	9	VH
10	VH				

CON5: <For Head up detector>

Pin No.	Signal	Pin No.	Signal
1	PHUPS	2	GND-L

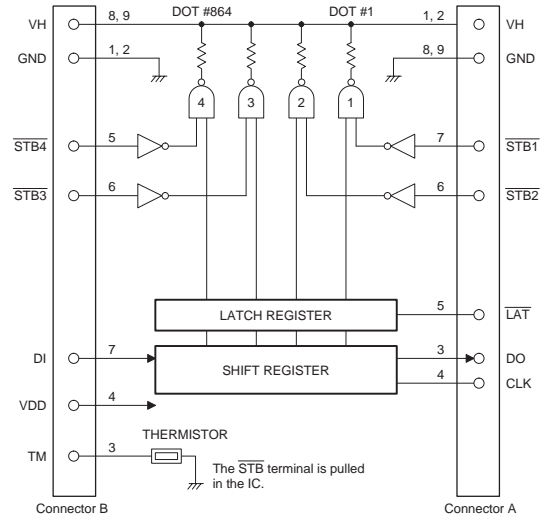
CON6: <For Journal paper feed motor>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	VJCOM	2	VJCOM	3	/JPFA
4	/JPFB	5	/JPFC	6	/JPFD

CON7: <For Receipt paper feed motor>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	VRCOM	2	VRCOM	3	/RPFA
4	/RPFB	5	/RPFC	6	/RPFD

#### 3) Thermal head block diagram



Thermal head connector A

Pin No.	Signal	Description
1	VH	Head application voltage
2		
3	D out	Data output signal
4	CLK	Clock signal
5	/LAT	Latch Signal
6	/STB2	Strobe Signal 2
7	/STB1	Strobe Signal 1
8		
9	GND	GND

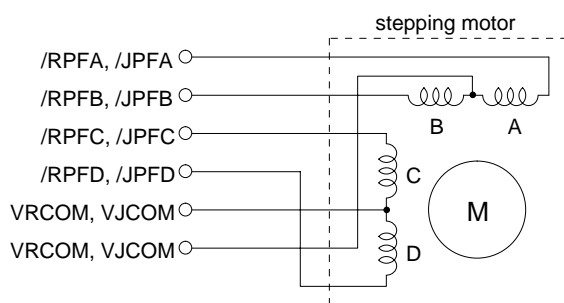
Thermal head connector B

Pin No.	Signal	Description
1	GND	GND
2		
3	TM	Thermistor detecting signal
4	VDD	+5V
5	/STB4	Strobe Signal 4
6	/STB3	Strobe Signal 3
7	D in	Data input signal
8		
9	VH	Head application voltage

Print data which has been entered through signal Din and synchronized with the CLOCK signal is stored in /LAT according to the timing (864 dots) of the /LATCH signal. Stored print data is output by the /STROBE1, /STROBE2, /STROBE3, and /STROBE4 signals to energize the heating element. The print data (864 dots) is divided by four STROBE signals into the following four parts before being output.

STROBE No.	DOT No.	Dots/Strobe	Note
/STROBE4	577 ~ 864	288	Excluding dots No.1 ~ 8, 369 ~ 496 and 857 ~ 864
/STROBE3	433 ~ 576	144	
/STROBE2	289 ~ 432	144	
/STROBE1	1 ~ 288	288	

#### 4) Motor block diagram



#### <JOURNAL MOTOR>

PIN No.	SIGNAL NAME	DESCRIPTION
1	VJCOM	COMMON voltage
2		
3	/JPFA	JOURNAL-side paper feed motor phase A driving signal
4	/JPFB	JOURNAL-side paper feed motor phase B driving signal
5	/JPFC	JOURNAL-side paper feed motor phase C driving signal
6	/JPFD	JOURNAL-side paper feed motor phase D driving signal

#### <RECEIPT MOTOR>

PIN No.	SIGNAL NAME	DESCRIPTION
1	VRCOM	COMMON voltage
2		
3	/RPFA	RECEIPT-side paper feed motor phase A driving signal
4	/RPFB	RECEIPT-side paper feed motor phase B driving signal
5	/RPFC	RECEIPT-side paper feed motor phase C driving signal
6	/RPFD	RECEIPT-side paper feed motor phase D driving signal

The paper feed motors are stepping motors with 4-phase driving coils. The motors are driven by switching over the driving coils.

<MOTOR DRIVE SEQUENCE> ON: Energized/OFF: Not energized

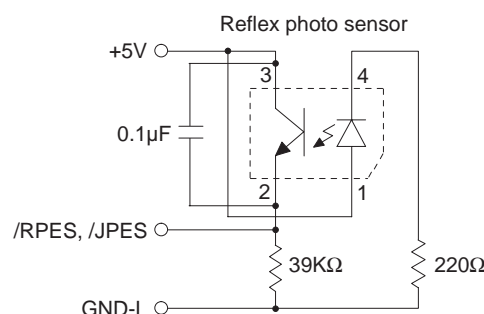
#### JOURNAL MOTOR

STEP No.	PHASE A	PHASE B	PHASE C	PHASE D
1	ON	OFF	OFF	ON
2	ON	OFF	ON	OFF
3	OFF	ON	ON	OFF
4	OFF	ON	OFF	ON

#### RECEIPT MOTOR

STEP No.	PHASE A	PHASE B	PHASE C	PHASE D
1	ON	OFF	ON	OFF
2	ON	OFF	OFF	ON
3	OFF	ON	OFF	ON
4	OFF	ON	ON	OFF

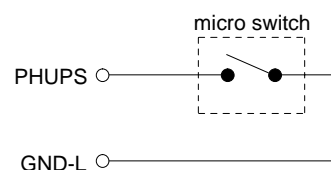
#### 5) End sensor block diagram



SIGNAL NAME	DESCRIPTION
+5V	+5V
/RPES	Receipt paper end sensor detecting signal
/JPES	Journal paper end sensor detecting signal
GNDL	GND

The photo diode on the PWB detects the presence/absence of the paper passing under the journal and receipt platens.

#### 6) Head up sensor



SIGNAL NAME	DESCRIPTION
PHUPS	Head-up detecting signal
GNDL	GND

The micro switch on the left side of the printer detects the head-up state.

ON: Head-down

OFF: Head-up

## CHAPTER 3. HANDLING THE PRINTER

### 1 Special Handling Considerations

#### (1) When transporting the printer

- When transporting the printer, the head up lever should be raised in the ②: Head up position so that the head does not contact the platen rollers. Failure to do so may result in poor the printer performance.
- When the printer is carried, it should not be held at the connectors, the lead wires, paper take-up frame, etc.
- When carrying the printer, never allow large impacts to occur, such as dropping, collision, etc.
- When carrying the printer, hold the frame with both hands, as shown in the figure below.

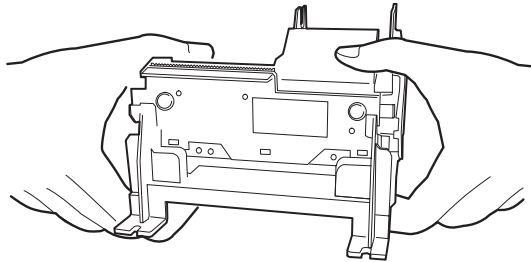


Fig. Carrying the printer unit

- When transporting the printer, pack it using anti-static packaging.

Do not touch the thermal head and the surface of the PWB. When handling the printer, properly ground yourself.

Head up lever position

#### ①: Close position

- The head is in contact with the platen roller
- The printer operates and feeds the paper.

\* The illustration shows the state when the PT-cover is removed for explanation purposes only.

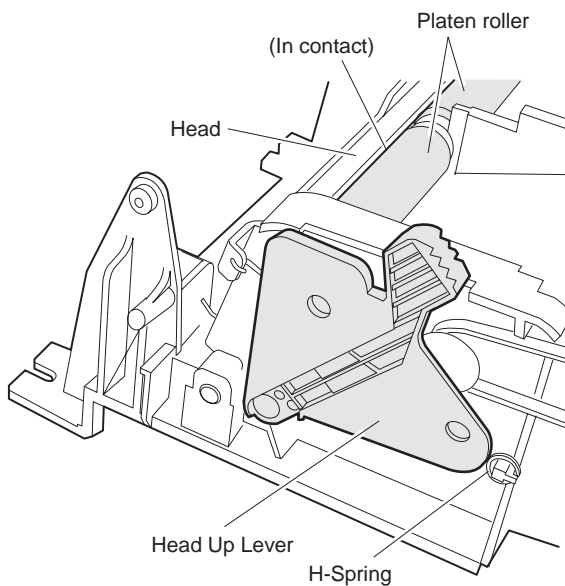


Fig. ① Close position

#### ②: Head-up position

- The head is not in contact with the platen roller.
- To be used when the printer is out of service for a long time or when it is to be transported.

\* The illustration shows the state when the PT-cover is removed for explanation purposes only.

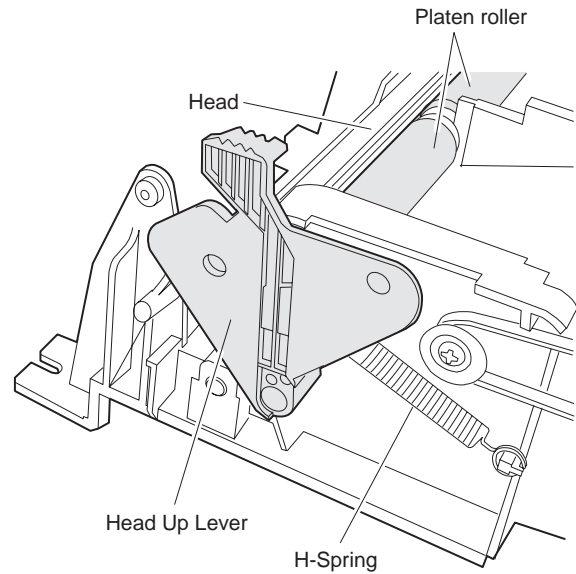


Fig. ② Head-up position

#### ③: Cleaning position

- To be used when the head and platen roller are to be cleaned.
- Do not leave the head-up lever in this position; Failure to do so might result in a deformed H-spring, thus leading to poor print or paper feed quality.

\* The illustration shows the state when the PT-cover is removed for explanation purposes only.

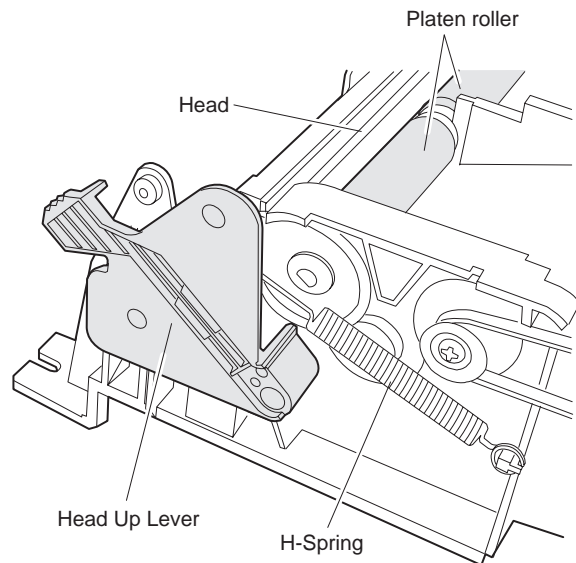


Fig. ③ Cleaning position

## (2) When storing the printer

### ① Printer

- When storing the printer, make sure to raise the head up lever in the (B): Head up position. Never store it with the (A): Close position or (C): Cleaning position.
- Avoid storing the printer in areas with a lot of dust, direct sunlight, or high humidity.
- If the printer is stored for an extended period, put it in an anti-static bag and store it in a dry place.
- The thermal paper should not be left for an extended period (more than two weeks at normal temperature) held between the platen roller and the head (A): Close position).
- Do not leave the printer in the (C): Checking position for more than 2 days.

### ② Paper (thermal paper)

- Since thermal paper gradually darkens from about 70°C, pay attention to heat, humidity, sun light, etc., regardless whether or not the paper has been printed on.
- Avoid high temperature and high humidity areas.
- Avoid direct sun light.  
(When thermal paper is left near the window in direct sun light, the base color may change and discoloring may take place.)

## (3) When using the printer

### ① Printer

- Since the printer contains a thermal head, permanent magnets (motor) and micro switches, avoid using it in areas with a lot of iron powder, dust, etc.
- Never operate with no paper loaded.
- Never pull out the paper (forward or backward) with the head head against the platen rollers.
- Do not touch the head heating elements and driver ICs, especially with hard or metal objects.
- During printing and just after printing completes (for about 15 minutes), the area around the head and the motor surface are very hot. Never directly touch them with your hand.
- Operate the head up lever only when required.  
Never touch the surface of the head heating elements.  
(Dirt may stick to the heating elements and affect the printing.)
- Never leave the printer with the platen rollers and the head directly touching (A): Close position).  
Do not leave the head-up lever in the (C): Cleaning position for more than 2 days.  
(When the printer is left for a while, make sure to raise the head up lever in the (B): direction in Fig. Loading paper.)
- Since electronic parts are used in the print head, never touch the thermal head with your bare hand.  
Before handling the printer, execute proper body grounding procedures to avoid static electricity.

### ② Paper (thermal paper)

- Use only the specified thermal paper.  
(Thermal paper with a rough surface may result in poor print quality and shorten the print head life.)

## (4) When mounting the printer

- Make sure the power is turned OFF before installing the printer.
- When attaching the printer to your product, avoid areas with a lot of iron powder, dust, etc.

## 2. Loading the Paper (insertion and removal)

Use only the paper specified in the specification sheet issued by our company.

### (1) Loading paper

Load the paper following the procedure below.

- ① Cut the edge of the paper as shown in the figure below.

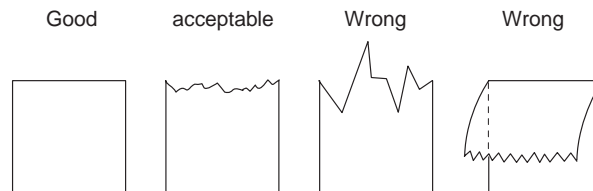


Fig. Shape of the paper edge

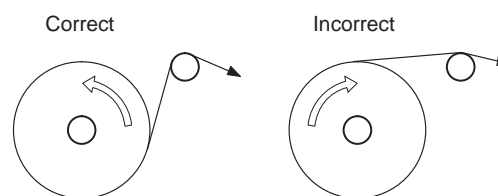


Fig. Paper setting state

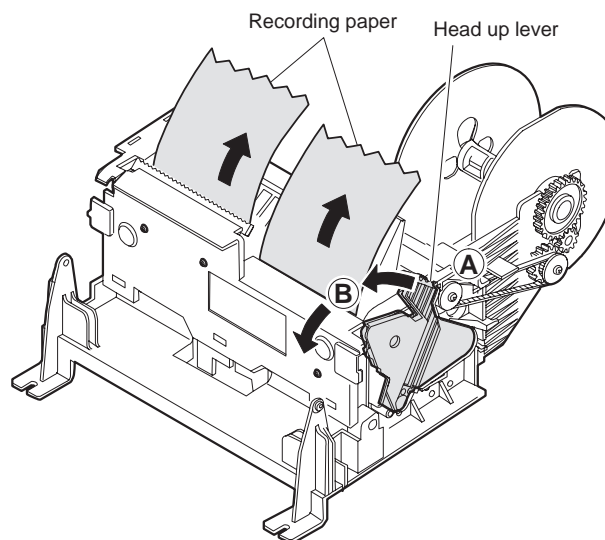


Fig. Loading paper

- ② Turn the ECR ON.
- ③ Make sure the head-up lever is in the (A) (Close) position.
- ④ Insert the paper through the paper inlet.
- ⑤ The paper is automatically loaded into the printer by the auto loading mechanism and the leading edge of the paper roll is delivered a little from the paper outlet.
- ⑥ If there is slack in the paper or the not straight paper is set the head up lever in the head up position (B) and adjust the paper positioning.
- ⑦ If the length of the paper delivered from the outlet is insufficient, feed the paper with the receipt and for journal feed keys.

(Note) If paper is fed without following the above procedure, it could cause improper paper feeding and jamming.

## (2) Unloading the paper

The paper can be unloaded in two ways.

- ① Move the head up lever toward (B): Head up position and then pull the paper out by hand in the forward direction (feeding direction) or in the reverse direction.
- ② Operate the paper feed keys to discharge the paper from the printer. Move the head up lever to the head up position (B) and remove the paper toward the front.

- (Notes)
- Operations other than those listed above could cause improper paper feeding and jamming, and could cause damage to the head heating elements.
  - Never pull the paper out without using the head up lever, regardless of the direction, forward or reverse.

## (3) Removing paper after a paper jam

If a paper jam occurs, follow the procedure below.

- ① Put the head-up lever in the (C) Cleaning position to widen the spacing between the head and platen rollers so that you can easily check for a paper jam.
- ② Remove the jammed paper by hand.
- ③ Return the head-up lever in the (A) Close position.

When a tool such as tweezers is used, take care not to touch the heating elements of the head with the tool. The head is still hot after printing is stopped. Please wait a while for the head to cool down prior to cleaning a paper jam.

# CHAPTER 4. MAINTENANCE

To maintain proper performance of the printer for a long period of time and to prevent trouble, carry out the maintenance and management procedures as follows.

## 1. Cleaning

- Removing stains  
Wipe dirt off the head and platen rollers with a clean cloth saturated with an alcoholic solvent (ethanol, methanol, IPA: Isopropyl alcohol).  
For cleaning the head assembly, refer to the daily checks section.

- (Notes) Never use thinner, benzene, trichloroethylene or ketone group solvents since they may damage or deteriorate rubber and plastic parts.

- Removing dust and lint  
Cleaning by same form of suction (with a vacuum cleaner) is desirable.

(Note) Check lubrication at various points after cleaning.

## 2. Inspection

The maintenance and inspection items for the printer are divided into 2 types. One is "Daily checks" for the operator/manager who uses the terminal, and the other is "Periodic checks" for someone with more technical knowledge. Maintenance and inspections of the printer should be carried out by properly qualified personnel.

### (1) Daily checks

Check that the printer is used properly and kept in the good repair.

#### Daily check items

- ① The specified paper is being used.
- ② The paper has not become discolored.
- ③ Check print quality and if significant deterioration is found, clean the head heating elements.

#### <Head cleaning method>

- 1) Place the head-up lever in the (C): Cleaning position. Make sure it is in the locked position.
  - 2) Wipe the heating element of the head and platen rollers clean with a soft cloth or cotton moistened with alcoholic solvent (ethanol, methanol or IPA: isopropyl alcohol).
  - 3) After making sure the alcoholic solvent has thoroughly evaporated, undo the head-up lever and platen rollers in the (A) Close position.
- \* If paper dust is attached to the platen roller surface, the paper feeding power is reduced. Be sure to clean the platen roller surface when cleaning the head.
- \* The illustration shows the state when the PTcover is removed for explanation purposes only.

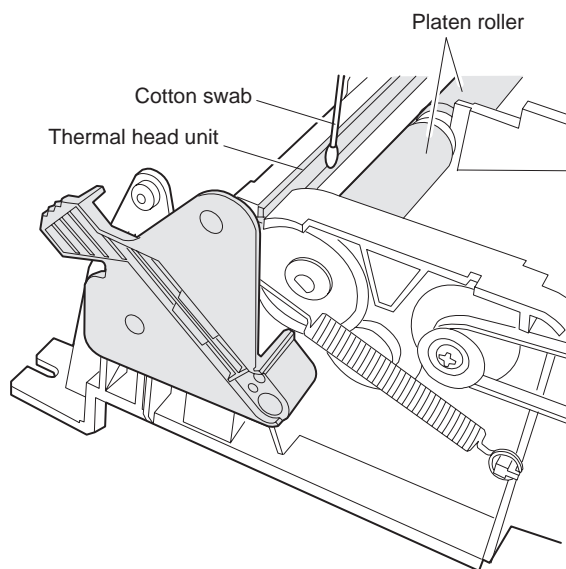


Fig. Head and Platen roller cleaning

## (2) Periodic checks

Check the items listed in the table below every 6 months, and correct any problems.

Table of periodic checks

No.	Check items	Standard	Procedure
1	Dust, lint and dirt sticking to various parts.	<ul style="list-style-type: none"> <li>The mechanism should not have a lot of dirt, lint or dust on its surface. Foreign substances should not be allowed to collect.</li> <li>The paper guide should not be clogged with paper chips, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Clean the unit with a vacuum cleaner.</li> <li>Remove paper chips with a tweezers.</li> </ul>
2	Lubrication	<ul style="list-style-type: none"> <li>See "Chapter 6".</li> </ul>	<ul style="list-style-type: none"> <li>Refer to "Chapter 6" For lubrication.</li> </ul>
3	Operational check	<ul style="list-style-type: none"> <li>Printing occurs without abnormality.</li> <li>Feeding operates without abnormality.</li> <li>Observe respective functions. Look for abnormal operation caused by parts wear, deformation, bending, etc., do not exist.</li> </ul>	<ul style="list-style-type: none"> <li>See "Chapter 5".</li> <li>See "Chapter 5" and "Chapter 6".</li> </ul>

## CHAPTER 5. TROUBLESHOOTING

Troubleshooting and repair of the printer is classified into two levels (A and B), depending on the difficulty of the repair.

Persons undertaking a repair should consider their level of technical skill and the level of the repair before attempting to ensure that the trouble is handled correctly.

### 1. Repair Levels

Level A: This requires general knowledge about the operating principles and structure of the printer, along with technical skill and minimum experience.

Level B: This requires full knowledge of the operating principles and structure of the printer, adequate technical skill, and repair experience.

### 2. Repair Procedures

If trouble occurs, observe the symptoms, determine the cause by referring to Section 3 "Repair Guidelines," and repair it. The "Repair Guidelines" are divided into the following five columns so that most troubles can be analyzed and a solution found.

- **Problem**  
Check for symptoms.
- **Condition**  
Compare the problem with the examples given in this column and determine if they match.
- **Cause**  
Causes that can be assumed for the problem are listed. Determine the cause. Also, refer to the repair level indicated for each cause.
- **Checkpoints and Checking Method**  
How to check for the cause of a problem is listed. Check the defective part as instructed in this column.
- **Repair Method**  
Repair the defective part as instructed in this column. If the same problem occurs after the repair, check the other causes in the "Cause" column again, and repair accordingly.



### 3. Repair Guidelines

Phenomenon	Condition	Cause	Level	Checkpoints and Checking Method	Repair Method
1. Printing is not executed.	Nothing is printed.	(1) The Head cable is disconnected.	A	<ul style="list-style-type: none"> <li>Verify that the Head cable is properly connected.</li> </ul>	<ul style="list-style-type: none"> <li>If the FFC-head is not properly connected, connect it firmly.</li> </ul>
		(2) The common or signal line of the Head cable is broken.	B	<ul style="list-style-type: none"> <li>Check the common and signal lines of the Head cable for continuity.</li> </ul>	<ul style="list-style-type: none"> <li>If continuity cannot be confirmed, replace the Head cable.</li> </ul>
		(3) The printhead does not contact the platens.	A	<ul style="list-style-type: none"> <li>Verify that the head up lever is set to the proper position.</li> </ul>	<ul style="list-style-type: none"> <li>Set the head up lever to the printing position.</li> </ul>
		(4) The input pulse is defective	B	<ul style="list-style-type: none"> <li>Verify with the oscilloscope that the input pulse is within the specified range.</li> </ul>	<ul style="list-style-type: none"> <li>If the input pulse is not generated or is not within the specified range, adjust the drive control circuit.</li> </ul>
2. Dots are missing continuously.	A specific dot is not printed.	(1) A foreign substance is attached to the heating elements of the printhead.	A	<ul style="list-style-type: none"> <li>Verify that nothing is attached to the heating elements of the printhead.</li> </ul>	<ul style="list-style-type: none"> <li>Clean the heating elements of the printhead.</li> </ul>
		(2) The heating elements of the printhead are damaged.	B	<ul style="list-style-type: none"> <li>Verify that the heating elements of the printhead are not damaged.</li> </ul>	<ul style="list-style-type: none"> <li>If the heating elements are damaged, replace the thermal head.</li> </ul>
		(3) The signal line of the Head cable is broken.	B	<ul style="list-style-type: none"> <li>See Cause (2) of Phenomemon 1.</li> </ul>	
		(4) The input pulse is defective.	A	<ul style="list-style-type: none"> <li>See Cause (4) of Phenomenon 1.</li> </ul>	
3. Dots are missing occasionally.	Dots are missing occasionally or the color of some dots becomes light.	(1) A foreign substance is attached to the surface of each platen roller.	A	<ul style="list-style-type: none"> <li>Verify that nothing is attached to the surface of each platen roller.</li> </ul>	<ul style="list-style-type: none"> <li>Clean the surface of each platen roller.</li> </ul>
		(2) The surface of each platen roller is deformed.	A	<ul style="list-style-type: none"> <li>Verify that the surface of each platen roller is not deformed.</li> </ul>	<ul style="list-style-type: none"> <li>If deformation is found, replace the corresponding platen roller ass'y.</li> </ul>
		(3) A foreign substance is attached to the heating elements of the printhead.	A	<ul style="list-style-type: none"> <li>See Cause (1) of Phenomenon 2.</li> </ul>	
		(4) The heating elements of the printhead are damaged.	B	<ul style="list-style-type: none"> <li>See Cause (2) of Phenomenon 2.</li> </ul>	
4. The printing color is light.	The overall printing color is light.	(1) The head up lever position is not correct.	A	<ul style="list-style-type: none"> <li>Verify that the head up lever is set to the correct position.</li> </ul>	
		(2) Displaced or deformed H-springs.	A	<ul style="list-style-type: none"> <li>Make sure the H-springs are correctly installed and not deformed.</li> </ul>	
		(3) The H/C frame is warped.	B	<ul style="list-style-type: none"> <li>Verify that the H/C frame is not warped.</li> </ul>	
		(4) The surface of the platen is deformed.	A	<ul style="list-style-type: none"> <li>See Cause (2) of Phenomenon 3.</li> </ul>	
		(5) The heating elements of the printhead have deteriorated.	B	<ul style="list-style-type: none"> <li>Verify that the heating elements of the printhead have not deteriorated.</li> </ul>	
		(6) The input pulse is defective.	A	<ul style="list-style-type: none"> <li>See Cause (4) of Phenomenon 1.</li> </ul>	
		(7) The roll paper is of poor quality.	A	<ul style="list-style-type: none"> <li>Verify that the specified-roll paper is being used.</li> <li>Check the paper for proper color development and excessive dust.</li> </ul>	

Phenomenon	Condition	Cause	Level	Checkpoints and Checking Method	Repair Method
5. Paper cannot be loaded.	The end of the roll paper cannot be inserted into the paper guide section.	(1) The leading edge of paper roll is improperly cut .	A	<ul style="list-style-type: none"> <li>Check that the leading edge of the paper roll is properly cut and is not folded.</li> </ul>	<ul style="list-style-type: none"> <li>If the leading edge of the paper roll is improperly cut, cut it properly and insert into the printer again.</li> </ul>
		(2) A piece of paper is blocking the paper guide path.	A	<ul style="list-style-type: none"> <li>Verify that no piece of paper is blocking the paper path.</li> </ul>	<ul style="list-style-type: none"> <li>Remove the paper. Note: When removing the piece of paper be sure not to damage the printhead and platen roller with any tools.</li> </ul>
6. Paper is not fed.	Roll paper is not fed, and printing is repeated on the same line.	(1) Roll paper feeding is defective.	A	<ul style="list-style-type: none"> <li>Verify that the specified roll paper (width, thickness, and diameter) is being used.</li> <li>Verify that the roll paper is loaded properly in the paper supplying device.</li> </ul>	<ul style="list-style-type: none"> <li>Use the specified roll paper.</li> <li>Load the roll paper correctly.</li> <li>Tension: <math>\leq 50\text{g-cm}</math></li> </ul>
		(2) A foreign substance is attached to part of the power transmission mechanism unit, or any of the gears in the unit are damaged.	B	<ul style="list-style-type: none"> <li>Verify that no foreign matter attached to any part of the power transmission mechanism unit and that no gears are damaged.</li> </ul>	<ul style="list-style-type: none"> <li>If any foreign matter is attached, remove it.</li> <li>If any of the gears are damaged, replace them.</li> </ul>
		(3) The paper feed motor is damaged.	B	<ul style="list-style-type: none"> <li>Check the resistance at each coil of the corresponding paper feed motor Resistance: Approx. <math>90\Omega \pm 10\%</math></li> </ul>	<ul style="list-style-type: none"> <li>If any abnormality is found, replace the paper feed motor.</li> </ul>
		(4) The paper feed motor drive signal is defective.	B	<ul style="list-style-type: none"> <li>Verify that the corresponding paper feed motor drive signal is normal.</li> </ul>	<ul style="list-style-type: none"> <li>If the drive signal is not output or is not within the specified range, adjust the drive circuit.</li> </ul>
7. The paper feed pitch is not uniform.	The line spacing is not uniform.	(1) Roll paper is not being fed correctly.	A	<ul style="list-style-type: none"> <li>See Cause (1) of Phenomenon 6.</li> <li>Check the platen roller for deformation.</li> </ul>	<ul style="list-style-type: none"> <li>If deformed, replace the platen roller with a new one.</li> </ul>
		(2) The feeding load of a paper roll exceeds the specification.	A	<ul style="list-style-type: none"> <li>See Cause (2) of Phenomenon 6.</li> <li>The paper roll isn't set properly.</li> <li>The paper roll doesn't meet the specification in size.</li> </ul>	<ul style="list-style-type: none"> <li>Reset the paper roll properly.</li> <li>Use a paper roll which meets the specification in size.</li> </ul>
		(3) Paper is jammed in the paper guide.	B	<ul style="list-style-type: none"> <li>Paper is jammed in the paper guide.</li> </ul>	<ul style="list-style-type: none"> <li>Remove paper. At this time, use caution to prevent damage to the platen roller.</li> </ul>
		(4) The paper feed motor drive signal is defective.	B	<ul style="list-style-type: none"> <li>See Cause (4) of Phenomenon 6.</li> </ul>	
		(5) The head up lever position is not correct.	A	<ul style="list-style-type: none"> <li>See Cause (1) of Phenomenon 4.</li> </ul>	
8. Paper end detection is not corrected.	Although paper exists in the paper guide path, the out-of-paper state continues.	(1) The paper end detector is defective.	B	<ul style="list-style-type: none"> <li>Check the signal level on the paper end detection circuit board.</li> </ul>	<ul style="list-style-type: none"> <li>If the signal level is abnormal, replace the paper guide ass'y.</li> </ul>
	When paper is removed from the paper guide path, the printer does not enter the out-of-paper state.	(1) A piece of paper or foreign substance is blocking the paper path.	B	<ul style="list-style-type: none"> <li>Verify that nothing is blocking the paper path.</li> </ul>	<ul style="list-style-type: none"> <li>If anything is blocking the paper path, remove it.</li> </ul>
		(2) The paper end detector is defective.	B	<ul style="list-style-type: none"> <li>See Cause (1) of Phenomenon 8.</li> </ul>	

Phenomenon	Condition	Cause	Level	Checkpoints and Checking Method	Repair Method
9. Roll paper is not taken up.	Roll paper is fed but not taken up.	(1) The paper take up shaft is worn or damaged.	B	• Verify that the paper take up shaft is not worn or damaged.	• If any wear or damage is found, replace the paper take up shaft.
		(2) SP gear, C-spring or pulley is worn or doesn't rotate smoothly.	B	• Check paper winding parts for wear and damage.	• If wear or damage is found, replace the part with a new one.
		(3) Some of the gear teeth are worn or damaged.	B	• Verify that no teeth are worn or damaged.	• If any of the gear teeth are worn or damaged, replace the gear.
		(4) The paper take up belt is worn or stretched.	B	• Verify that the paper take up belt is not worn or stretched.	• If the paper take up belt is worn or stretched, replace it.
10. Paper cannot be taken up properly.	Because the tension to take up the roll paper is weak, the diameter of the paper taken up becomes larger.	(1) The paper take up shaft is worn or damaged.	B	• See Cause (1) of Phenomenon 9.	
		(2) SP gear, C-spring or pulley is worn or doesn't rotate smoothly.	B	• Replace SP gear, C-spring or pulley with new one.	
		(3) Paper roll swerves.	B	• Verify that the paper take up frame sub ass'y is not deformed or warped.	• If any deformation or warp is found, replace the paper take up frame sub ass'y.
		(4) Some of the gear teeth are worn or damaged.	B	• See Cause (3) of Phenomenon 9.	
		(5) The paper take up belt is worn or stretched.	B	• See Cause (4) of Phenomenon 9.	

## CHAPTER 6 DISASSEMBLY AND ASSEMBLY

- This chapter describes the procedure for disassembling the printer. It is advisable to reinstall the printer in the reverse order from disassembly, referring to "Cautions to be taken when installing."
- Some easy steps have been omitted.
- Only part names are described without indicating their part codes. For the part codes, refer to the Parts Guide.

### [Cautions to be taken when working on the printer]

- 1) The parts which need to be greased are indicated in "Cautions to be taken when reinstalling." Whenever such a part is replaced with a new one, grease it before installing.

Lubrication interval (rough guide)

- Every 6 months
- Every 2 years or 2,000,000 lines of printing
- Parts code of lubricant

Lubricant type	PARTS CODE	PRICE RANK
G36	00BB703600001	AU

- 2) Use caution not to cause the gear to become chipped or deformed when removing or reinstalling.
- 3) Do not touch directly the printing head.
- 4) Be sure to wear an earth band to ground your body.

### 1 REMOVE THE CUTTER 58 and H-COVER 58

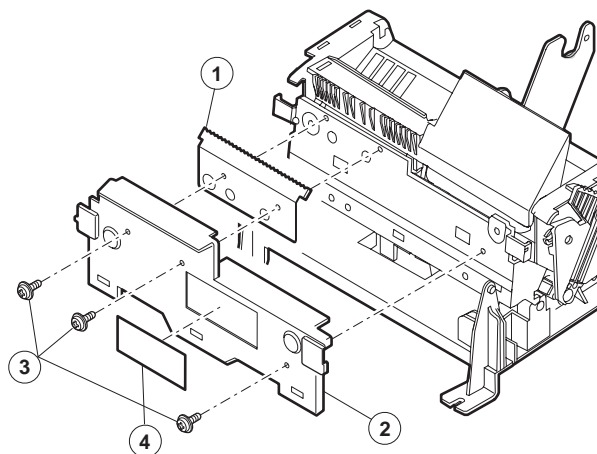


Fig. 1

### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	CUTTER 58	1
②	H-COVER 58	1
③	SCREW (M2 × 8)	3
④	CAUTION LABEL	1

### [DISASSEMBLY METHOD]

- 1) Remove the CUTTER 58 ① and H-COVER 58 ② :  
Using a Phillips screwdriver, remove the three SCREWS ③.  
Remove the CUTTER 58 ① and H-COVER 58 ②.  
The H-COVER 58 ② carries the "CAUTION" label ④.

## 2 REMOVE THE PR58H GEAR COVER, PT-COVER

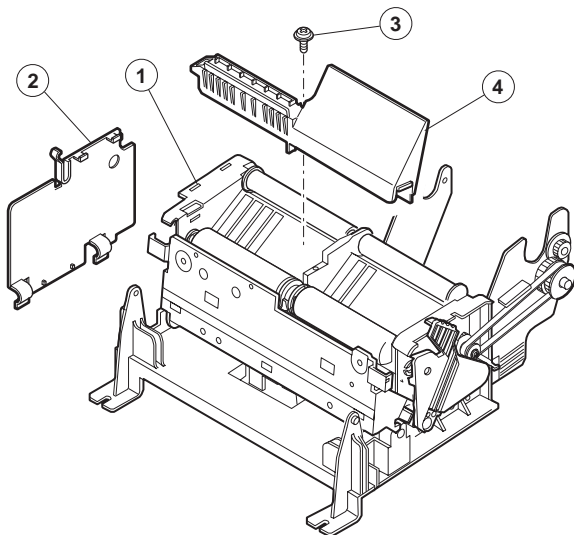


Fig. 2

### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	Housing PR58H	1
②	PR58H gear cover	1
③	SCREW (M3 × 5 Black)	1
④	PT-COVER	1

### [DISASSEMBLY METHOD]

- 1) Remove the PR58H gear cover ②  
Using a screwdriver, raise the two tabs of the PR58H gear cover ② and remove the PR58H gear cover ② from the housing PR58H ①.

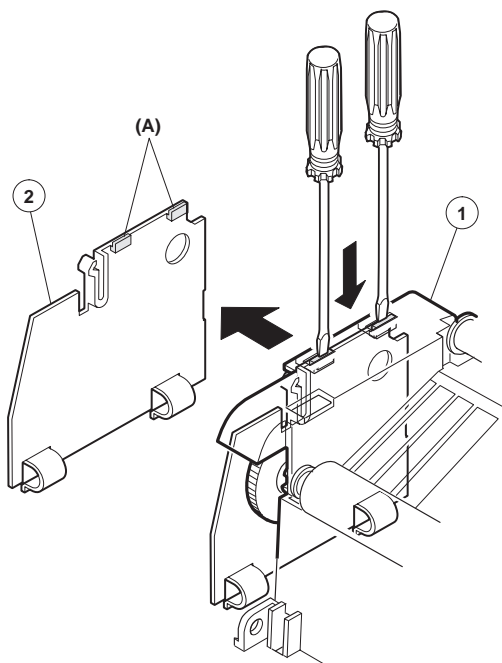


Fig. 3

- 2) Remove the SCREWS ③. Remove the PT-COVER ④.

\* Insert a flat-bladed screwdriver into the slit shown in the figure below.

Apply force into the direction indicated by the arrow, to raise the tang and pull out the PT-COVER upward.

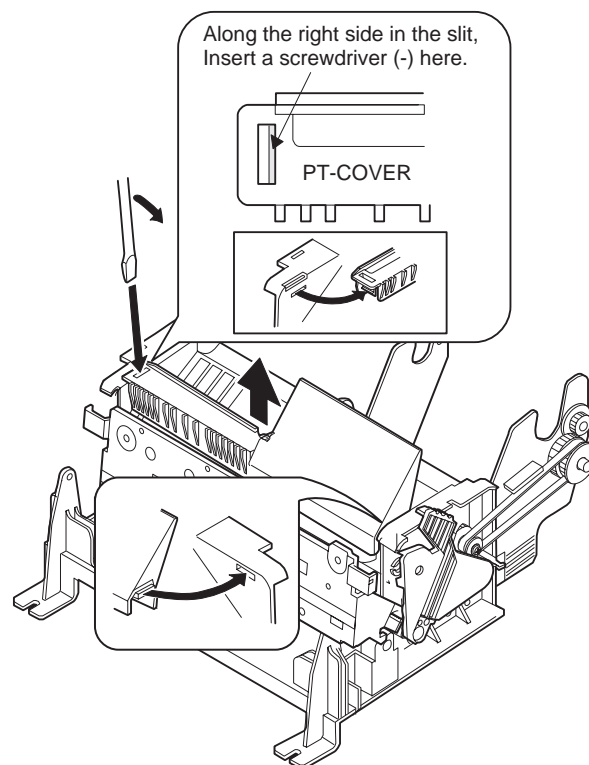


Fig. 4

### 3 REMOVE THE HEAD UNIT

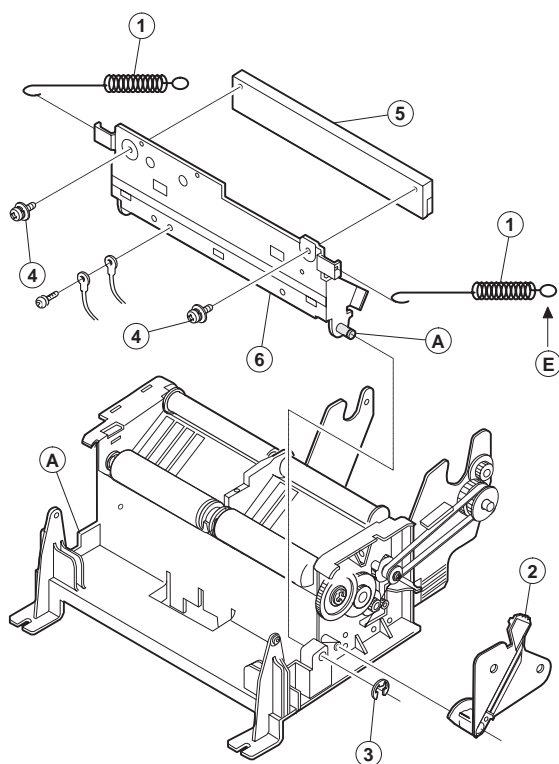


Fig. 5

#### [DISASSEMBLY METHOD]

- 1) Remove the H-SPRINGS ① on the right and left sides of the printer frame.

<Note> Pinch the H-SPRING at point E with long-nose pliers and remove it taking care not to deform the rib of the HOUSING A.

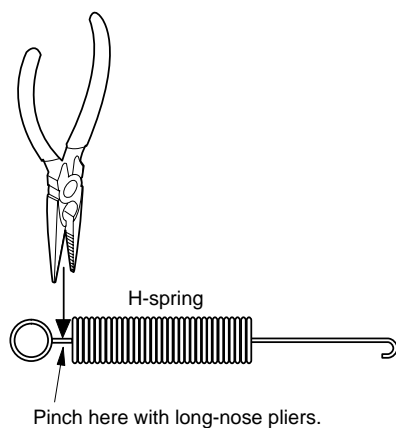


Fig. 6

- 2) Remove the HEAD UP LEVER ②.
- 3) Remove the E-RING ③.
- 4) Remove the HEAD FRAME UNIT (Part of the assembly of the THERMAL HEAD ⑤ and HEAD FRAME ⑥).

<Note> Use caution not to damage or deform the HEAD FRAME UNIT by inadvertently hitting them with the ROLLERS and gears.

- 5) Remove the two SCREWS ④ and remove the THERMAL HEAD ⑤ from the HEAD FRAME ⑥.

#### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	H-SPRING	2
②	HEAD UP LEVER	1
③	E-RING	1
④	SCREW (M3 × 6)	2
⑤	THERMAL HEAD	1
⑥	HEAD FRAME	1

\* Use caution not to touch the heating element of the THERMAL HEAD ⑤ and PWB.

#### [GREASING]

Apply grease on the two mounting areas ① of the HEAD FRAME ⑥.

### [Cautions to be taken when reinstalling]

#### 1. Adjusting the HEAD position

Whenever the THERMAL HEAD ⑤ is replaced with a new one, adjust its position for the HEAD FRAME ⑥.

##### • Procedure:

- 1) The screw hole for fixing the THERMAL HEAD ⑤ in the HEAD FRAME ⑥ is made a slot as shown in the figure below. First, align the screw hole in the THERMAL HEAD ⑤ with the bottom area of the slot and temporarily secure it with the SCREW ④.
- 2) Install the HEAD FRAME UNIT ⑤ on the HOUSING A.
- 3) Adjust the HEAD position and make sure that heating element of the HEAD ⑦ is most properly positioned, by performing a printing test. Do not adjust the Head position during printing; otherwise the HEAD might break down due to friction.

<Procedure for adjusting HEAD position>

- (1) Insert a flat-bladed screwdriver into the adjustment hole C in the HEAD FRAME ⑥. Adjust the HEAD upward little by little with the screwdriver until it reaches the desired position, and secure it with the SCREW ⑥ (tightening torque: 6.5 kgf-cm).
- 4) If there is a difference in darkness in print between the receipt and journal, insert the angle A's spacer into the gap between the HEAD FRAME unit and the thermal head as shown in the figure below.

#### 2. Direction of H-SPRING ①

Install the H-SPRINGS ① so that the hooks point outward.

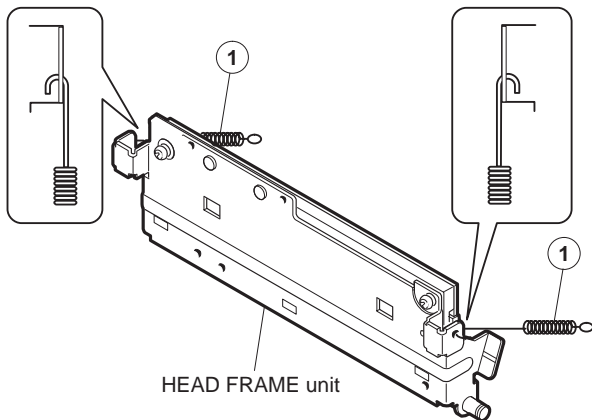


Fig. 7

#### 3. HEAD cable

Install the 9-pin connector to the right end of the THERMAL HEAD ⑤ and the 10-pin connector to the left end.

Use caution to make a good connection or a deformed connector when connecting the THERMAL HEAD ⑤ and HEAD cables.

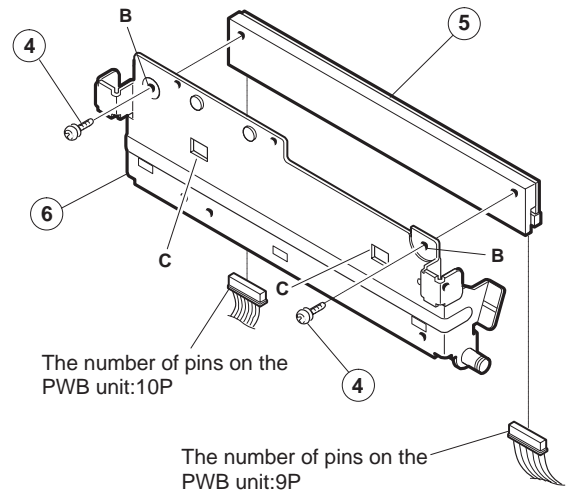
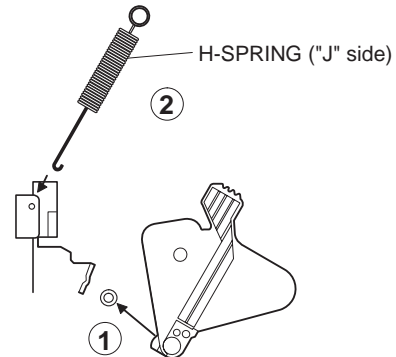


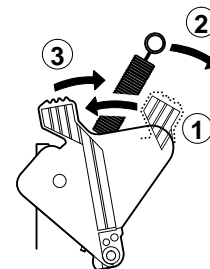
Fig. 8

#### 4. Installing HEAD UP LEVER and H-SPRING ("J" side)

##### 1)



##### 2)



##### 3)

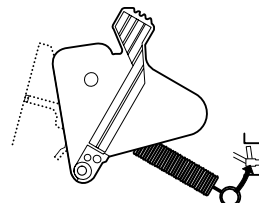


Fig. 9

## 4 REMOVE THE PLATEN ROLLER

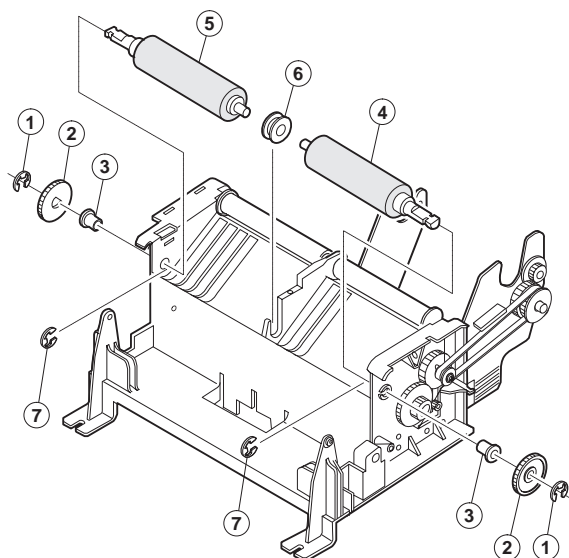


Fig. 10

### [DISASSEMBLY METHOD]

- 1) Remove the E-RING ① and the PF-GEAR ②.
- 2) Remove the E-RINGS (for bushing) ⑦. Remove the BUSHINGS ③.
- 3) Remove the PLATEN ROLLER "J" ④, PLATEN ROLLER "R" ⑤ and the PT-HOLDER ⑥.

### [Cautions to be taken when reinstalling]

1. How to tell PLATEN ROLLER "J" ④ from PLATEN ROLLER "R" ⑤

As shown in the figure below, the PLATEN ROLLER "J" ④ has a black line on it.

The two PLATEN ROLLERS have different polishing directions of the rubber roller. Pay attention to the direction when installing them.

( PLATEN ROLLER "R" )



without black line

( PLATEN ROLLER "J" )



with black line

Fig. 11

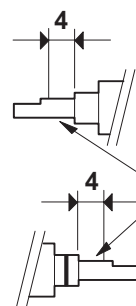
### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	E-RING	2
②	PF-GEAR	2
③	BUSHING-1	2
④	PLATEN ROLLER "J" (PR58H)	1
⑤	PLATEN ROLLER "R" (PR58H)	1
⑥	PT-HOLDER	1
⑦	E-RINGS (for bushing)	2

### 2. LUBRICATIONS

Apply grease on the PLATEN ROLLER "J" ④, PLATEN ROLLER "R" ⑤, and PT-HOLDER ⑥ in the points indicated below.

( PLATEN ROLLER "R" )  
( PLATEN ROLLER "J" )



Apply grease (G36)  
on the  
PLATEN HOLDER  
shaft, 4 mm in width.

( PT-HOLDER )



Apply grease (G36)  
inside the bushing.

Fig. 12



## 5 REMOVE THE GEARS

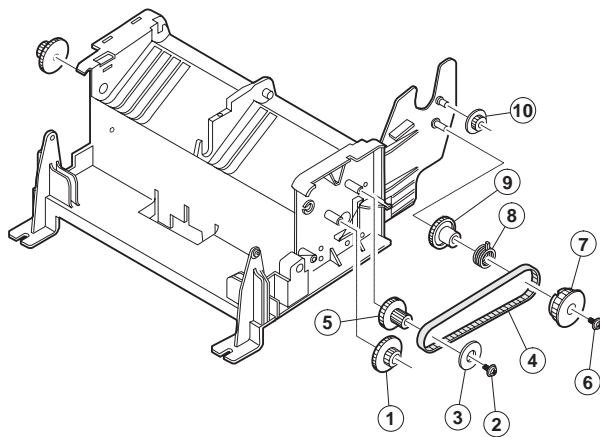


Fig. 13

### [DISASSEMBLY METHOD]

#### <RIGHT SIDE>

- 1) Remove the IDLE GEAR-L ①.
- 2) Remove the SCREW ② and WASHER ③.
- 3) Remove the TIMING BELT ④.
- 4) Remove the PULLEY GEAR ⑤.
- 5) Remove the SCREW ⑥.
- 6) Remove the PULLEY ⑦, C-SPRING ⑧, SP-GEAR ⑨ and IDLE GEAR-S ⑩.

#### <LEFT SIDE>

- 1) Remove the IDLE GEAR-L ①.

### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	IDLE GEAR-L	2
②	SCREW (M3 × 6)	1
③	WASHER	1
④	TIMING BELT	1
⑤	PULLEY GEAR	1
⑥	SCREW (M2×5) (Black)	1
⑦	PULLEY	1
⑧	C-SPRING	1
⑨	SP-GEAR	1
⑩	IDLE GEAR-S	1

### [Cautions to be taken when reinstalling]

1. Please note the position of the WASHER ③ when securing the WASHER ③ to with the SCREW ②.

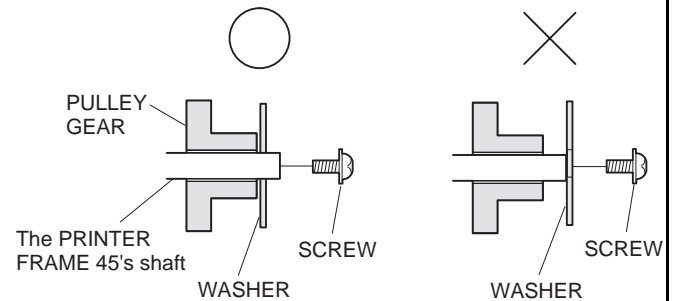


Fig. 14

### 2. LUBRICATIONS

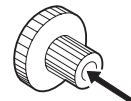
Apply grease (G-36) on the IDLE GEAR-L ①, PULLEY GEAR ⑤, SP-GEAR ⑨, and Housing PR58H in the areas indicated below.

#### ( IDLE GEAR-L )



Apply grease on the gear teeth contact and inside the shaft hole.

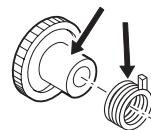
#### ( PULLEY GEAR )



Apply grease inside the gear shaft hole.

#### ( SP GEAR )

Apply grease on the gear shaft and inside the shaft hole.



Apply grease sufficiently.

#### ( PRINTER FRAME45 )

Apply grease on the shafts.

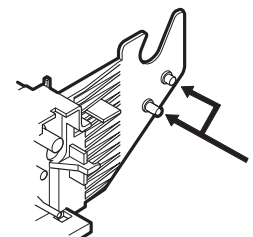


Fig. 15

## 6 REMOVE THE HARDWARE PARTS

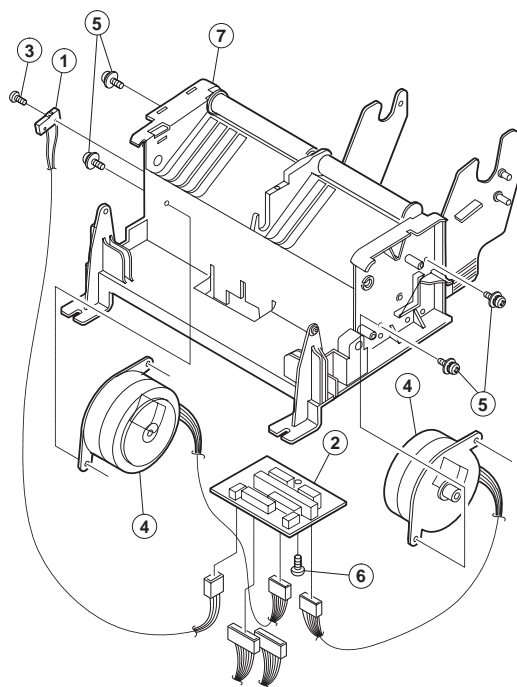


Fig. 16

### [DISASSEMBLY METHOD]

#### <MICRO SWITCH>

- 1) Remove the connector cable of the MICRO S/W UNIT ① from the connector CON5 (2 pins) of the PWB UNIT ②.
- 2) Remove the SCREW ③ and the MICRO S/W UNIT ①.

#### <JOURNAL SIDE MOTOR>

- 1) Remove the connector cable of the MOTOR ④ from the connector CON5 (6 pins) of the PWB UNIT ②.
- 2) Remove the two SCREWS ⑤ and the MOTOR ④.

#### <RECEIPT SIDE MOTOR>

- 1) Remove the connector cable of the MOTOR ④ from the connector CON7 (6 pins) of the PWB UNIT ②.
- 2) Remove the two SCREWS ⑤ and the MOTOR ④.

#### <PWB UNIT>

- 1) Remove the SCREW ⑥ and the PWB UNIT ②.

### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	MICRO S/W UNIT	1
②	PWB UNIT	1
③	SCREW (M2 × 12)	1
④	MOTOR (PR58H)	2
⑤	SCREW (M3 × 6)	4
⑥	SCREW (M3 × 5)	1
⑦	HOUSING 58H	1

### [Cautions to be taken when reinstalling]

1. Wire the MICRO SWITCH UNIT ① cable as shown below.

Secure the MICRO S/W UNIT ① with the SCREW ③ (tightening torque: 4.0 kgf-cm).

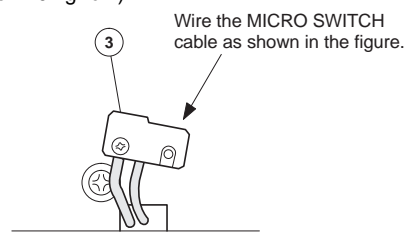


Fig. 17

2. Wire each cable as shown below.

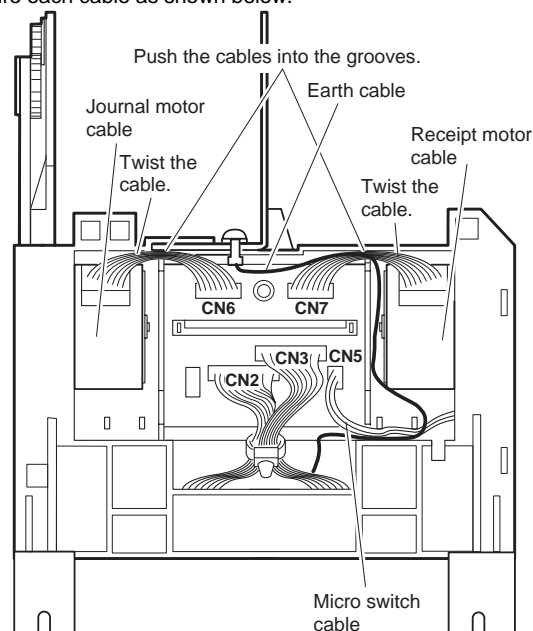


Fig. 18

## 7 REMOVE OTHER PARTS

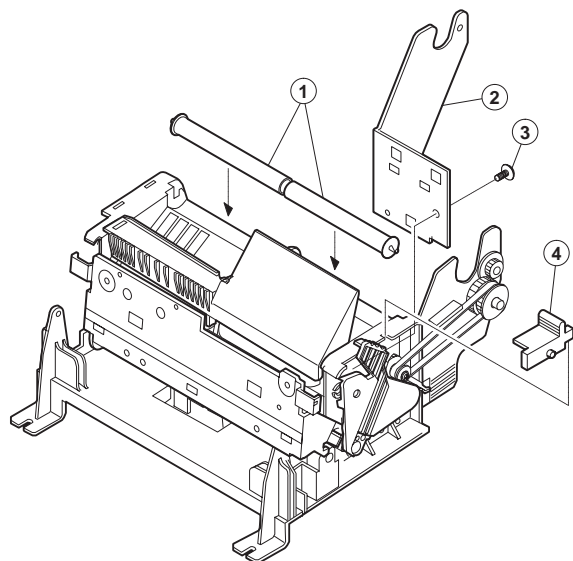


Fig. 19

### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	FEED ROLLER	2
②	PR58H SP-GUIDE	1
③	SCREW (M3×5)	1
④	STOPPER	1

### [DISASSEMBLY METHOD]

- 1) Remove the two FEED ROLLERS ① from the PR58H PRINTER FRAME (45).
- 2) Remove the SCREW (M3×5) ③ and remove the PR58H SP-GUIDE ②.
- 3) Remove the STOPPER ④ from the PRINTER FRAME (45).

#### 2. LUBRICATION

Apply grease (G-36) on the mounting areas of the FEED ROLLER.

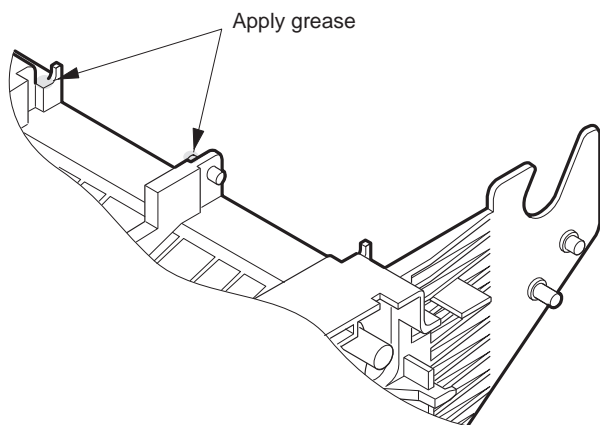


Fig. 20

## 8 GREASING POINTS WHEN INSTALLING PR58H SPOOL ①

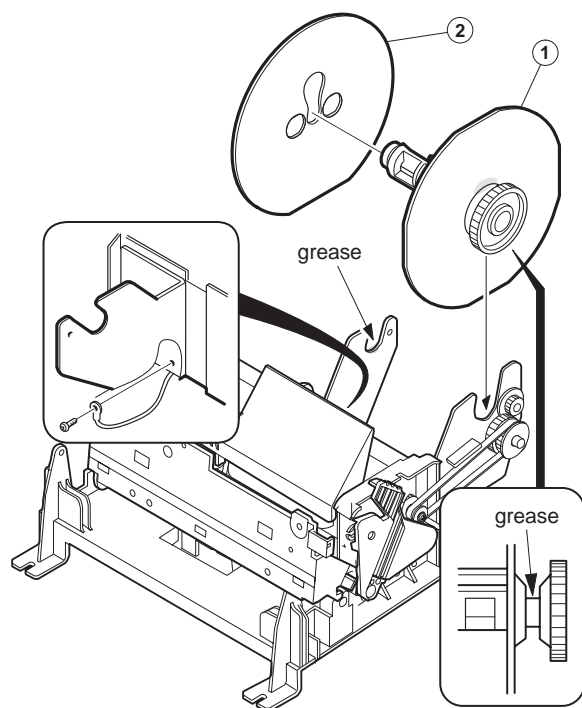


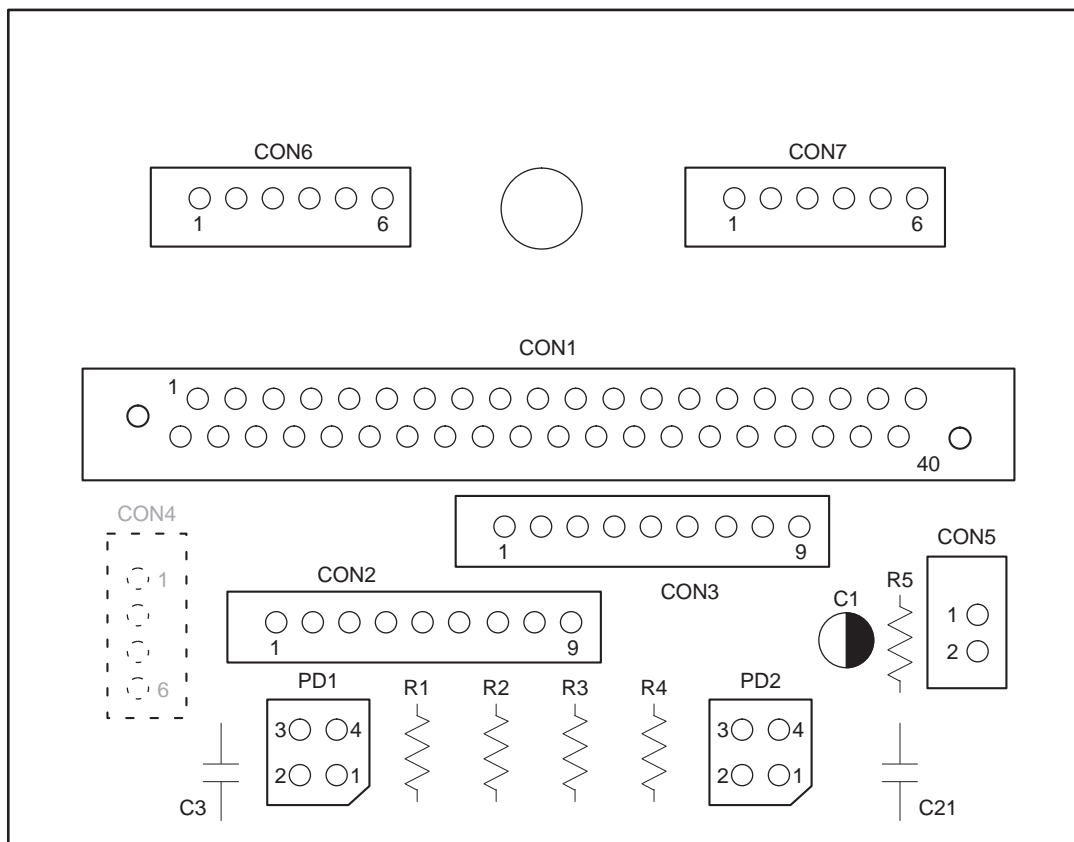
Fig. 21

### [PARTS LIST]

No.	PARTS NAME	Q'ty
①	PR58H SPOOL	1
②	G/WHEEL	1

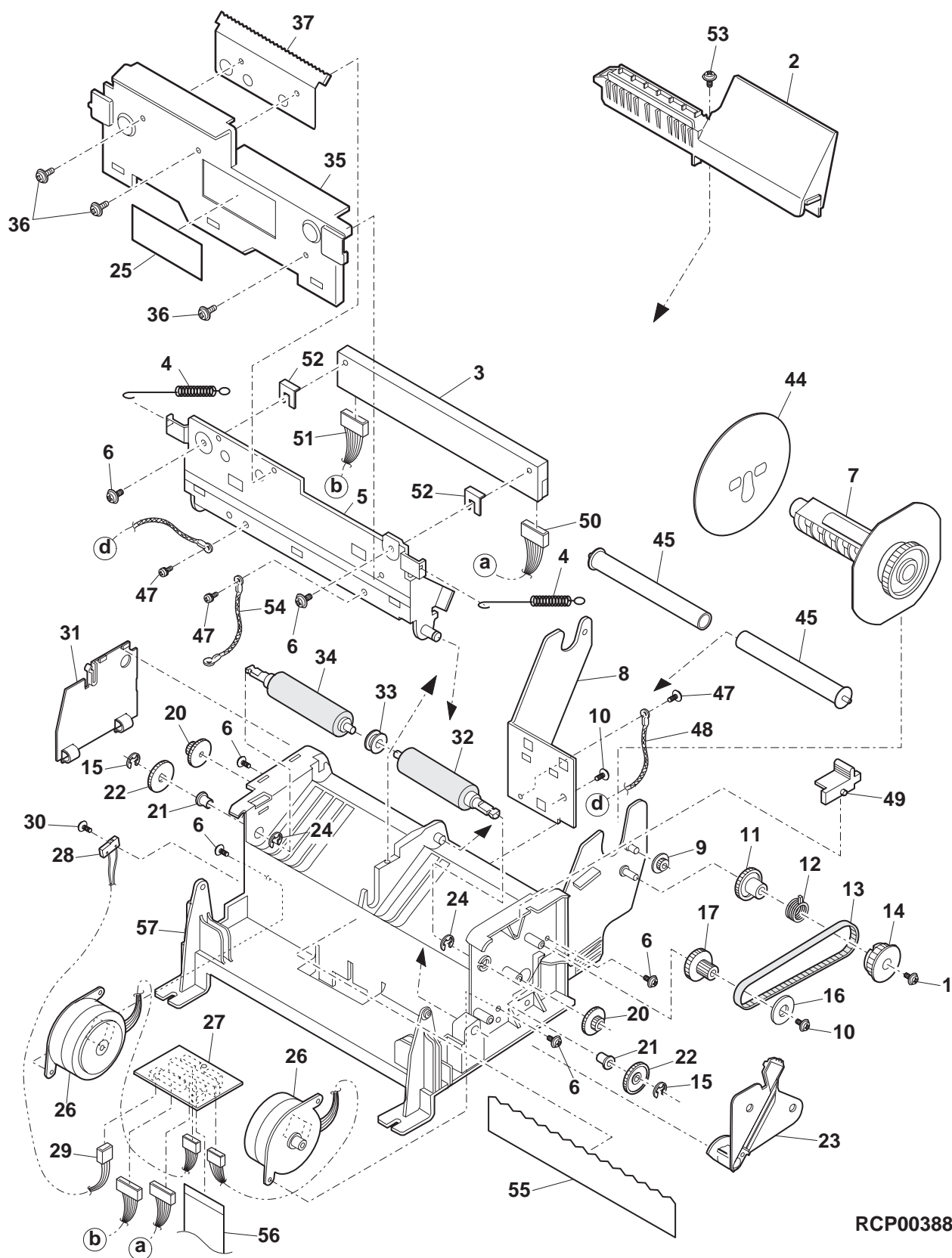
- Apply grease (G-36) in the points indicated in the figure.
  - 1) Left end of the PR58H SPOOL ①
  - 2) SP ANGLE in the area to which the right end of the PR58H SPOOL ① is fitted.

## CHAPTER 7. PWB LAYOUT



# Parts guide

## 1 Exteriors



RCP00388

2	PWB unit
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- 2 -

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